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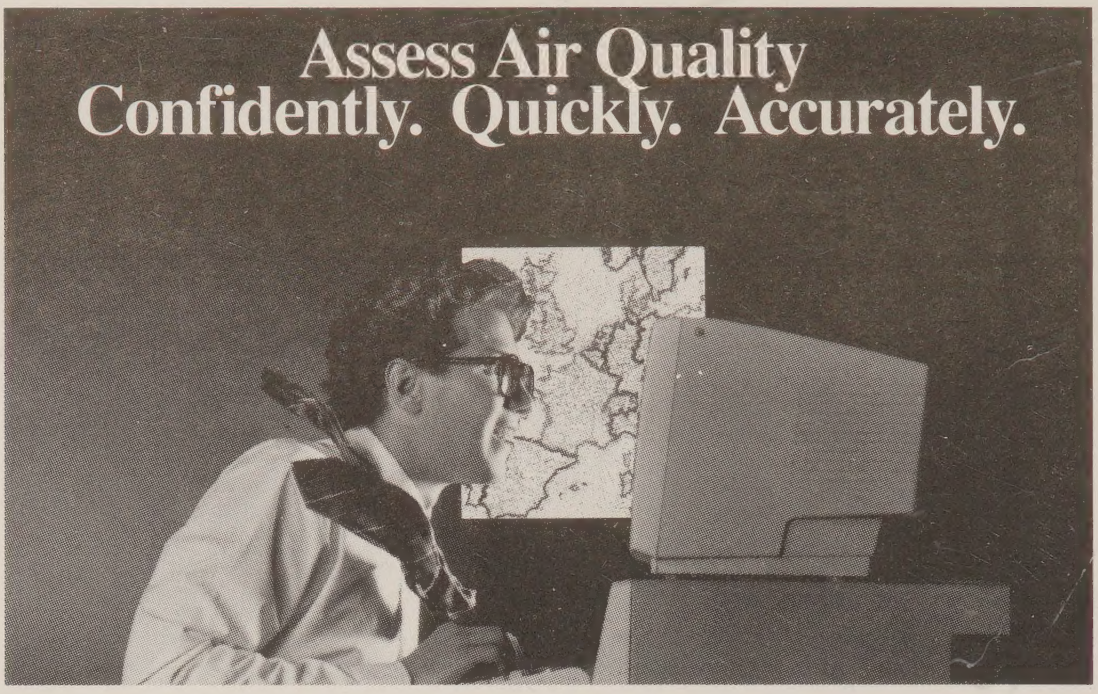

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NATIONAL SOCIETY FOR CLEAN AIR AND ENVIRONMENTAL PROTECTION

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EDITORIAL

LEARNING ABOUT THE ENVIRONMENT

Letters from schoolchildren make up a large proportion of NSCA's daily postbag. Most are seeking material for project work, and many reveal a touching concern for the environment. For others, though, the collection of information is clearly a chore which holds little interest for them. An educational adviser told us recently of the ad hoc proliferation of environmental teaching in the classroom: "Not Acid Rain *again!*" chorused one class, having already covered the subject in biology, geography and environmental studies.

Whilst it is encouraging to see environmental education now firmly established in the school curriculum, it would be disappointing if it became "just another subject" on the timetable. No-one doubts that environmental problems are growing rapidly on a global scale; the imperative of sustainable development will ultimately demand radical changes in lifestyle, changes which may be unpopular unless environmental concern takes root in young hearts, as well as taxing young minds. Environmental study lends itself well to an objective scientific assessment of the ecosystem which we inhabit, but also requires a subjective moral assessment of our responsibilities — as individuals and as a society — to that system. We note with interest a number of recent initiatives which seek to explore environmental questions in the context of religious education and world faiths. Green issues are not simply of academic interest but of direct and crucial relevance to each of us.

NSCA has always held education and training to be a major priority. As long ago as 1907 our forerunner the Coal Smoke Abatement Society was training stokers in the art of pollution abatement. Throughout our history our emphasis has been as much on informing the public as on pressurising the powers that be, since environmental reform can only be nurtured in a supportive climate of opinion.

Today we print and distribute hundreds of thousands of information leaflets annually and produce a wide range of materials aimed at the classroom. Our cartoon booklet "Junior Guide to Air Pollution" was launched last December and has proved hugely popular; it is already being reprinted. In a bid to involve schools more directly we will be launching a special leaflet competition later in the year. Finally, the last session of this year's NSCA Conference will look at the need for environmental education from three perspectives: teaching in schools; local authority initiatives which inform and involve the public; and the problems of the NIMBY syndrome. We hope that you will be able to attend — this important subject has something to teach us all.

ENVIRONMENTAL PROTECTION 1991

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NSCA NEWS AND VIEWS

CARS, CATS AND CANISTERS

First unleaded petrol, then catalytic converters, now carbon canisters. The battle to reduce air pollution from cars has brought rapid changes in the technologies required for emission control. The next debate will be over the need to reduce evaporative emissions of petrol. This will almost certainly lead to the fitting of so-called carbon canisters to cars — but will they be the right type? And will further measures also be necessary?

1. Why Canisters?

The next few years will see the introduction of catalytic converters which will significantly reduce pollution from individual vehicle exhausts. But exhaust pipes are not the only source of concern. The latest EC draft directive(1) on cutting car pollution contains proposals for controls on hydrocarbons — or volatile organic compounds (VOCs) — which evaporate from the fuel tank and fuel system. In Europe around 10 per cent of man-made VOCs come from this source, with a further 3 per cent from petrol distribution and 2 per cent from car refuelling at petrol stations (2). The two major sources of VOCs are car exhausts — soon to be controlled by the introduction of catalysts — and solvents. The European Commission is keen to control VOCs because they are implicated in the formation of photochemical smog and ground-level ozone pollution. Some specific VOCs such as benzene pose additional health worries.

The EC proposals will require the fitting of carbon canister technology to cars from 1993. Already standard in the US and Japan, canisters allow the car fuel system to "breathe" whilst preventing petrol vapour from escaping to the atmosphere. The vehicle fuel system breathes through the canister, which is full of activated carbon or charcoal. Petrol vapour is trapped and returned to the tank as the system breathes in, thus saving energy as well as reducing pollution. Canisters are relatively cheap to fit; according to the Department of Transport they will add about 1 per cent to the cost of a new car(3).

There are two types of canister design — small and large. Small canisters have a capacity of about 1 litre and are effective at controlling the normal "breathing" of the fuel system, caused by the expansion of vapour in the tank during daily temperature fluctuations or due to heat from the engine when the car is parked. Large canisters are about 4-5 litres in capacity, and offer the additional advantage of controlling evaporative losses during refuelling at the petrol station, and emissions whilst the car is being driven.

Hydrocarbon evaporative emissions also arise from the petrol storage and distribution system. The Commission is expected to propose controls — called "Stage I" controls — on the distribution chain from refinery to filling station.

The final source of emissions is the actual point of refuelling at the petrol pump. In parts of the US "Stage II" controls have been introduced with vapour vacuum recovery systems attached to petrol pump nozzles, sucking up hydrocarbon vapour as refuelling takes place. As noted above, the fitting of large carbon canisters to cars also offers the possibility of controlling refuelling emissions.

2. What Happens Next?

The current EC proposals do not address running losses, and consider the control of refuelling losses to be of low priority. As a result they will only require the fitting of small canisters at a European level. However there may be mounting concern at local or national level to control refuelling emissions, particularly where photochemical pollution is high, or where health concerns about benzene take priority. Discussions are now taking place about the next step in emission reductions, and the most effective means for controlling refuelling emissions. The two options for control here are Stage II controls on petrol pumps or the use of large canisters. Both options have advantages and disadvantages.

Stage II controls could be introduced relatively quickly, and if necessary only in areas where VOC emissions were considered too high. Such controls have been used for several years in parts of the US, Sweden and Switzerland. The European oil industry's environment secretariat CONCAWE reports that Stage II controls have an efficiency of only 55 per cent, rising to 85 per cent as car filler pipes become standardised(2). Controls on the petrol pump will, of course, fail to control other evaporative emissions from the car whilst running.

Large canisters would take a long time to become fully effective, since they would only be fitted to new cars. They would need to be agreed on a Europe-wide basis since a requirement by one or more member states to fit large canisters would represent a barrier to trade. However CONCAWE claims a recovery efficiency of 95 per cent, and large canisters also control running losses.

The oil industry favours the large canister option. CONCAWE argues that large canisters would be much more cost-effective than Stage II controls. In the US large canisters are likely to be required by law soon, and European manufacturers wishing to sell in the US market will have to start fitting them anyway. Stage II would require investment for petrol retailers.

The car industry tends to favour Stage II controls. They point out that despite a slightly higher recovery efficiency for large canisters (Rover quote 90 per cent instead of 85 per cent for Stage II controls), Stage II controls will have an immediate impact. Rover note that "German authorities are in the process of introducing Stage II controls and a recent study has provided the basis for estimating that a 75 per cent reduction in refuelling emissions is possible within 5 years, whereas OBVR (large canister) introduction could take up to 20 years to achieve the same effect". They add that large canisters involve a more complex system requiring a 3-8 litre canister and additional valves;

"The difficulties and costs of fitting are significantly higher than for the 'small' canister"(4).

This poses a tactical problem for those concerned with pollution control. Do large canisters or "Stage II" controls, or some combination of both, represent the best practicable environmental option? In California, which has a particularly intractable VOC problem, Stage II controls have been in place for several years but new legislation will require large canisters in addition to these.

In the UK, Government policy is to support the current EC proposals — which would mean the introduction of small canisters — whilst awaiting the outcome of further research into refuelling from expert groups reporting to the EC(5).

In the light of current uncertainty NSCA decided to survey car manufacturers to see how they were planning to cope with the forthcoming legislation.

3. What are the Current Options?

There is increasing interest amongst fleet operators and the public in general in the "environmental friendliness" of cars. NSCA recently published a report (6) in which we evaluated the competing "green" claims of available engine technologies. Amongst the conclusions, we recommended the use of carbon canisters to reduce evaporative emissions from petrol-engined vehicles and oxidation catalysts to reduce a range of hydrocarbon emissions from diesel-engined vehicles.

It is clear that some companies and individuals are already specifying cars with catalytic converters in the interests of the environment, despite the fact that such technology will not be required under EC legislation until 1993. Carbon canisters will be required under the new EC "consolidated" vehicles directive, and oxidation catalysts may become necessary when tighter EC standards are proposed for diesel cars. Once again, there is the likelihood that some specifiers may opt for vehicles fitted with such technology in advance of any legislative requirement.

NSCA undertook a survey at the end of last year of the major motor manufacturers to determine which, if any, plan to offer such technologies as an option on their UK production cars. We also wished to investigate the apparent lack of catalyst options in the small and medium car range. The following questions were posed:

1. By the end of 1990, how many of your UK petrol models will be available with catalyst options;
   (a) in the <1.4l range: .... (out of.............................. models)
   (b) in the 1.4-2l range:........................ (out of.............................. models)
   (c) in the >2l range:.......................... (out of.............................. models)
   (d) none
2. Roughly what proportion of your car sales are catalyst models at present?
3. By the end of 1990, how many of your UK petrol models will be available with carbon canister options;
   (a) in the <1.4l range: .... (out of.............................. models)

(b) in the 1.4-2l range:.......................... (out of................................ models)
(c) in the >2l range:........................... (out of................................ models)
(d) none

4. If none, do you have plans to introduce petrol car carbon canister options in the future? yes/no

5. Will these generally be "small" or "large" canisters? small/large

6. By the end of 1990, how many of your UK diesel car models will be available with oxidation catalyst options;

(a) in the <1.4l range:......................... (out of................................ models)
(b) in the 1.4-2l range:.......................... (out of................................ models)
(c) in the >2l range:........................... (out of................................ models)
(d) none

7. If none, do you have plans to introduce diesel car oxidation catalyst options in the near future? yes/no

Some manufacturers were reluctant to give full details, but an interesting picture emerged from the replies. These are summarised below.

4. The Results

ALFA ROMEO: 5 out of 8 models with cat option.
The new Spider will have a canister as standard.

AUDI: All 37 models have cats and canisters as standard.

BMW: Cat option on all 3-series, standard on 5, 7 and 8 series.
Cat sales 50 per cent of total — takeup "variable with customers of the more expensive models more likely to have a catalyst".
Large canister option on all models.

CITROEN: Every model range has some cat versions available.
Small canisters will be introduced "in due course".
Citroen argue that oxidation catalysts for diesel are only of limited effectiveness and run the risk of producing sulphuric acid because of the relatively high sulphur levels in diesel. ". . .in Austria, where low sulphur fuel is available, Citroen market the BX diesel with a two way catalytic converter".

DAIHATSU: 2 out of 7 models with cat option.
Cat sales 25 per cent of passenger models.
Small canister option on 2 out of 7 models.
Plan to introduce oxidation cats for diesels.

FIAT: No cats currently but "planning to market most of its 1991 model range with catalyst options beginning in Spring".
Plan to introduce canisters "in line with US 83 spec".
No plans for diesel cats.
Also producing a mass-produced electric car (Elettra) and a low-NOx 1.9 turbodiesel with exhuast gas recirculation.

FORD: 97 models — "a high proportion of our model range" — with cat options. "Currently researching into. . .the most efficient form of carbon canister and catalysts for diesel engines".

HONDA: 5 out of 20 models with cats and canisters as standard, others planned. Cat sales currently 7 per cent of total.

JAGUAR: 9 out of 10 models now have cats as standard (cat uptake only 10 per cent prior to this).
Canister option "under consideration".

LADA: Currently negotiating with suppliers for cat models — no firm dates yet.

MAZDA: 5 out of 32 models with cat options.
Large canister options on 4 models.

MERCEDES BENZ: 20 out of 33 models with cat options. All but 3 of 1991 range will have cats as standard.
No plans for canisters.
"Our own 'clean' diesel concept surpasses all existing and planned legislation. . .working on both diesel catalysts and particulate traps".

MITSUBISHI: 5 out of 14 models with cat options.
14 per cent of sales are cat models.
No plans for canisters — "Not applicable for fuel injection engines".

MORGAN: All models have a cat option — 30 per cent of sales.
All models have large canister option.

NISSAN: Did not supply information.

PEUGEOT: 4 current models with cat options, all models in new 605 range as standard.
"Number of catalyst-equipped models sold has not been significant".
Will offer canisters "should relevant legislation become adopted".

PORSCHE: All cars have cats as standard — 100 per cent of sales.
All cars have "active-charcoal filters in tank venting systems" as standard.

RENAULT: Did not supply information.

ROLLS ROYCE: All 7 models have cat option — 10 per cent of UK sales, "expected to rise".
Small canister always fitted alongside cats.

ROVER: Most models have cat option — 1.5 per cent of sales. "Despite the availability of catalysts, and encouragement of their purchase through our 'environment' literature, the rate of catalyst purchase. . .has been disappointingly low".
Plans to introduce small canister option.

SAAB: All models have cats as standard.
No plans for canisters.

SKODA: 1 out of 3 models with cat option — 5 per cent of sales.

Plans for small canister option.

SUZUKI: No cat options — "reviewing our policy for 91/92".
Swift series has large canisters as standard — "other models will incorporate carbon canisters in the future".

TOYOTA: 6 out of 10 model ranges have cat options — 25-30 per cent of sales.
No plans for canisters.

VAUXHALL: 37 out of 117 have cat options.
All cat models have canisters.
"We consider carbon canisters to be essential when cats are fitted".
Diesel cats "await low sulphur content diesel fuel".

VOLVO: All models now have cats as standard — cat sales 60 per cent prior to this.
All models have canister as standard.
No diesel cats — "ongoing environmental research programme".

VW: 21 out of 49 models have cat options.
18 have canisters as standard plus 4 optional.
4 out of 8 diesel models have oxidation cats.

5. Analysis

Ford, Rover, Skoda, Vauxhall and VW now offer cat cars in the 1.4 litre and below range. However in some cases the option will cost up to an extra £550. Clearly the fitting of catalysts is costly — the new VW Polo with a cat as standard is around £200 more expensive than previous models, although VW puts the value of the cat-plus-engine-management system at £700. It is not surprising, therefore, to discover that most of the cat-as-standard options are towards the luxury end of the market, where the marginal cost of a catalyst system can more easily be absorbed. This is an environmental paradox; luxury cars, which arguably consume more than their fair share of resources and petrol, are most likely to have the cleanest exhausts.

Only VW have oxidation cats available for diesel cars, although Daihatsu have plans to introduce them.

The main obstacle to catalyst uptake is a financial one. From the point of view of global warming, we should encourage the use of smaller, more fuel efficient cars. However it is in the 1.4 litre and below sector where the additional costs of a catalyst are more noticeable. We are drawn to the conclusion that tax incentives are required to redress the balance in favour of the environment. Without such intervention, the uptake of catalysts is likely to be slow until they become a mandatory requirement. Millions of polluting cars will have been sold in the interim.

Several manufacturers have already integrated canisters into their production. Audi, Porsche and Volvo have cats and canisters as standard on all models. Vauxhall consider the fitting of canisters alongside cats to be essential; this is in contrast with a number of other manufacturers who offer cats but not canisters. Not all specified whether they would be using large or small canisters, but BMW, Mazda and Morgan at least are already fitting large canisters. Other manufacturers do not appear to have addressed the matter fully, and are awaiting the finalisation of EC legislation. Once again, the would-be green motorist finds most of the choice at the luxury end of the market, although both Vauxhall and VW do offer smaller cars with canisters.

References

1. European Commission COM(89)662 4704/90, 1990.
2. Closing the Gasoline System: Concawe, 1990.
3. Explanatory Memorandum: Department of Transport, 1990.
4. D. Chick, Rover Cars: personal communication, 1990.
5. D. Trippier: Parliamentary answer, 12.6.90.
6. Clean Cars — How to Choose One: NSCA, 1990.

NSCA ARCHIVES

Eric Raven
Hon. Member NSCA

Shortly after I retired in 1989 the Secretary General mooted the idea of cataloguing the Society's Archives. This seemed something that ought to be done and although I had no idea what was involved I agreed in principle. My wife takes a keen interest in local history and so it was not difficult to gain her interest in the project as well.

Three and a half days in Brighton at the beginning of May last year, with virtually unbroken sunshine, has much to commend it even if you are working. Such was the weather when we set about the task and found that the time we had given ourselves just sufficed.

We came home with sheaves of handwritten pages and four sets of newspaper cuttings. A few of the documents go back many years but mostly date from the beginning of the century. A decision was taken to stop at 1958. By then the 1956 Clean Air Act was beginning to take effect. That was also the year I became a Smoke Inspector so there may have been an underlying reluctance on my part to become an Archive!

One set of newspaper cuttings covers the Institute of Public Health Congress in July 1905, when Dr Des Voeux coined the word "smog", and also the Smoke Abatement Conference of December that year. The others are from the time when the *Public Health (Smoke Abatement) Bill* was being debated and the period immediately after it became an Act in 1926. These cuttings have been indexed and together with the Archives the exercise amounts to some 70 pages.

The cataloguing of the Archives is purely chronological and further indexing could be undertaken, but at least there is now a list to be consulted. I know that the Secretary General would very much like to see a definitive history of the Society produced and if what has been done provides a spur for an author to come forward that would be very satisfying. Ideally, of course, this calls for someone sufficiently near to Brighton to be able to consult the documents.

Headquarters will be looking at means of making the information available and this could result in greater consultation of the documents. The age of the newspaper cuttings varies from 65 to 85 years. Not surprisingly some have become delicate to say the least and would benefit from photographing before they disintegrate. Here again is a field for someone with the necessary interest and expertise.

For me the task was both interesting and rewarding. There in those papers were all the famous names from the pioneering days, reading like a roll of honour. Not for them the support of the present day Green Movement. They carried on their campaign in the face of apathy and opposition. They gave the Clean Air cause the impetus which environmental reforms invariably need before they become self-sustaining. It would be good to have an authentic account of their endeavours and also in passing to acknowledge the many unrecorded people in all walks of life who helped to rid the air of smoke and grime.

DIVISIONAL SEMINAR

The London, South East and Central Southern Divisions are finalising plans for a seminar to be held in London on 26 November 1991 on the subject of the environmental impact of transport in the South East. The programme is expected to cover problems of noise, pollution, congestion, etc., arising from road, rail, aircraft and transportation, the Channel Tunnel and the likely effects on the urban and rural environment.

For further details, contact the Hon. Secretary, Mr. Joseph Beagle, Tel: 081 452 0203.

ACID RAIN TEACHING PACK

The Dutch Clean Air Society, CLAN, has adapted and translated NSCA's acid rain teaching pack for use in Dutch primary schools. The pack was formally offered to the Minister of Education and to the Minister of the Environment on 4 March. In the first weeks following announcement of the pack, over 2000 advance orders were received.

MOT EMISSION TESTING

Transport Minister, Christopher Chope, has announced that emission testing is to be included in the annual MOT test from November 1991. The emission standards will be in an amendment to the *Road Vehicles (Construction and Use) Regulations 1986*, which means that they will be subject to enforcement at roadside spot checks as well as at the MOT test. They will apply to cars, light goods vehicles and other vehicles in the main MOT testing scheme; but not to motor cycles, three wheelers or diesel-engined vehicles.

The standards will be:

- ★ For vehicles first used on or after 1 August 1983, a maximum of 4.5 per cent carbon monoxide in the exhaust gas.
- ★ For vehicles first used between 1 August 1975 and 31 July 1983, a maximum of 6 per cent carbon monoxide in the exhaust gas.
- ★ For vehicles first used on or after 1 August 1975, a maximum of 1,200

parts per million (ppm) hydrocarbons in the exhaust gas. This will be sufficient to prevent the CO limit being circumvented.

★ For all vehicles, a check that there is not excessive smoke from the exhaust.

★ For all vehicles, a general proviso that carbon monoxide emission levels will not be required to be reduced below the vehicle manufacturer's specification for the engine fitted to the vehicle.

While welcoming this step, NSCA, along with other organisations, has expressed disappointment at the very lax standard proposed for carbon monoxide. According to the Minister's answer to a parliamentary question to set a tighter standard would be an unfair barrier to trade under European Community legislation: where CO emission tests are undertaken in other countries, the current standard is usually 4.5 per cent.

As all car manufacturers already give CO specifications for their own models, NSCA can see no fundamental reason why each model should not be required to continue to meet such a standard, perhaps with an allowance for wear. Such a requirement would not discriminate against particular makes or models; it could not be construed as a barrier to trade, or unfair competition for cars which have higher CO specifications; all that is suggested is that cars continue to meet a standard based on their original specifications.

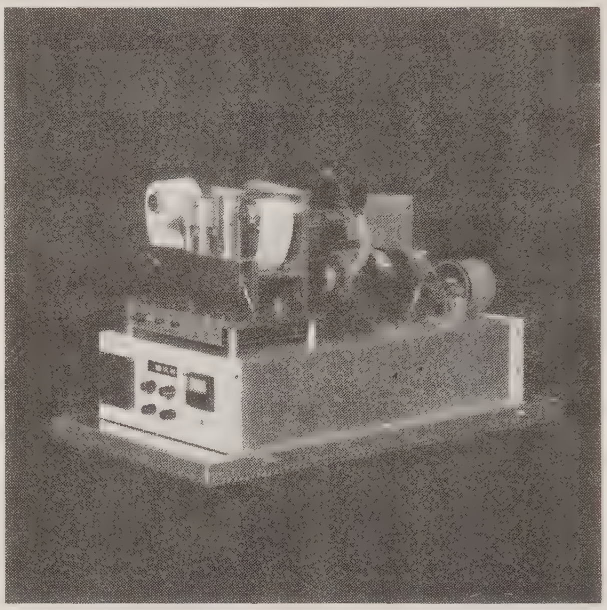
Proposals for an EC Directive on roadworthiness are under discussion and would set emission standards for testing in-use vehicles. We understand that a CO standard of 3.5 per cent has already been mooted — this would represent a significant improvement over the 4.5 per cent. However, a system based on manufacturers' specifications would be even more effective.

STRAW AND STUBBLE BURNING

The Ministry of Agriculture, Fisheries and Foods is consulting on interim regulations to be implemented in advance of the ban on straw and stubble burning from 1993. The interim regulations which will replace existing local authority bye-laws, where these exist, include many of the points in the current National Farmers' Union Code.

NSCA has been involved in discussions on the regulations and is pleased to see that the draft regulations prohibit burning where wind conditions are or are likely to become unsuitable — i.e. more than force 3. NSCA is also pleased to note that the proposed list of crops to be exempted from the regulations has been considerably narrowed. However, MAFF is considering exempting potato haulm on the basis that it does not give "any cause for public complaint". Results from NSCA's annual surveys show this not to be so and we will be taking this up with the Ministry.

SD100 ATMOSPHERIC SMOKE DETECTOR



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INTEGRATED POLLUTION CONTROL AN OVERVIEW

by

David Trippier MP
Minister of State for the Environment

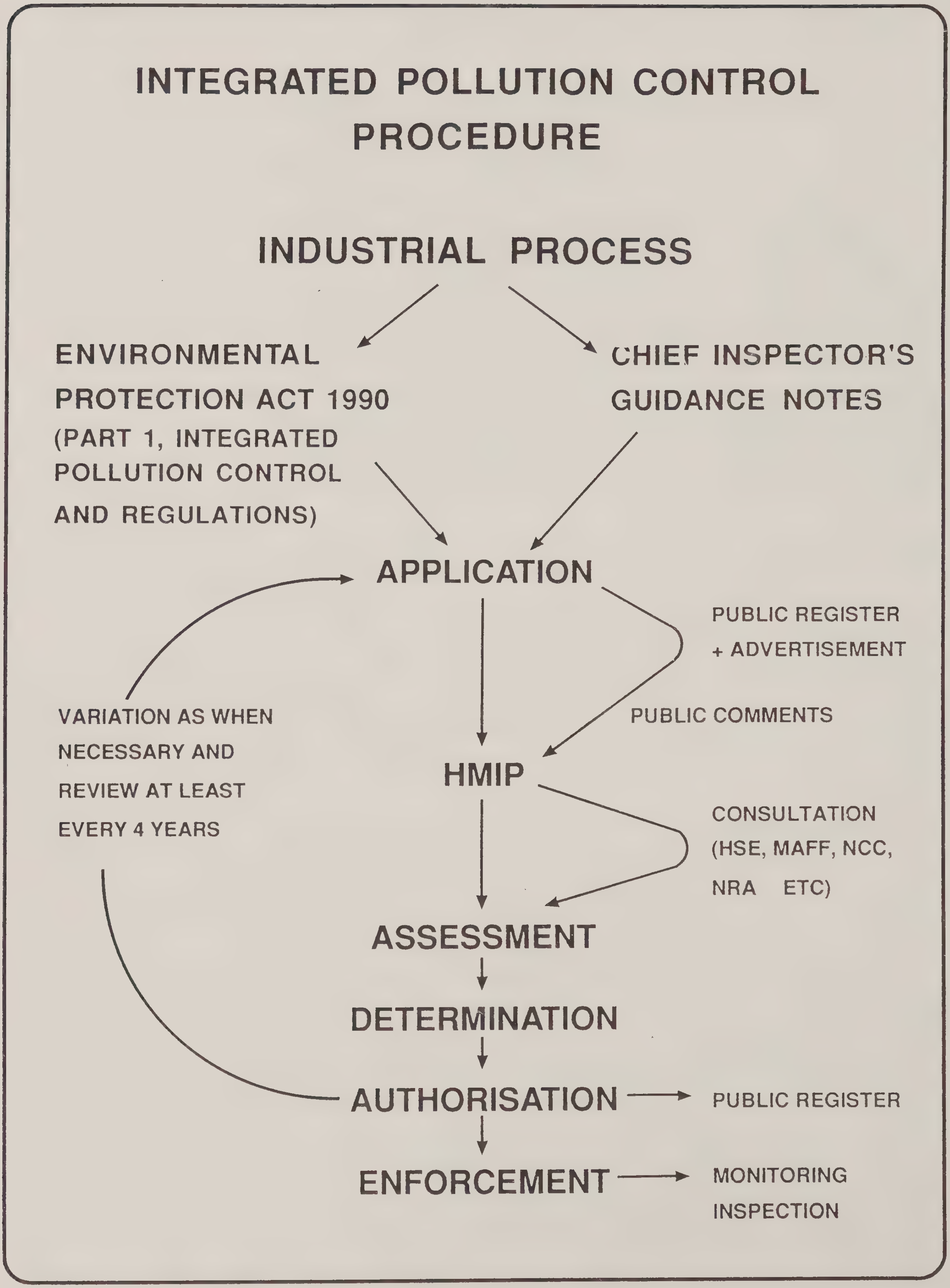
We are living in an age of unparalleled public interest in environmental issues and that is to be welcomed. Public concern has been running at a consistently high level for the past 2-3 years, and the Government has responded with a series of important measures aimed at preventing pollution and protecting our environment.

Two particularly substantial initiatives came to fruition towards the end of 1990: in September the White Paper on the Environment was published, and we are actively implementing and promoting its many recommendations; and in November 1990 the *Environmental Protection Bill* went onto the statute book. The centre piece of the Act as far as industry is concerned is our new system of Integrated Pollution Control (IPC).

The Department of the Environment has just issued *IPC — A Practical Guide* which explains how the Act and accompanying Regulations will work. A copy of this can be obtained from Julia Rafat, EPI Division, Department of the Environment, Room A107, Romney House, 43 Marsham Street, London SW1P 3PY.

The Government, industry and individuals alike must face up to the major environmental challenges that are with us now and will continue to arise in the future. It is heartening that industry is beginning to meet its side of the challenge by participating actively in moves to "green" its practices. There is little doubt that a sound environmental strategy will improve a company's local, national and even international reputation. During the 1960s we wasted a lot of time and energy in a rather futile debate. Some environmentalists saw industrial advance as a harbinger of destruction. Industrialists responded by attacking its critics as wishing to lead us back to agrarian poverty. The situation has since changed and now industry can win praise for its environmental achievements. Environmentalists are now working alongside industrialists to improve the quality of our environment. We have to recognise that industry must be allowed to grow and compete fairly in a developing world market. But

FIGURE 1


INTEGRATED POLLUTION CONTROL PROCEDURE
INDUSTRIAL PROCESS
ENVIRONMENTAL PROTECTION ACT 1990 (PART 1, INTEGRATED POLLUTION CONTROL AND REGULATIONS)
CHIEF INSPECTOR'S GUIDANCE NOTES
APPLICATION
PUBLIC REGISTER + ADVERTISEMENT
PUBLIC COMMENTS
VARIATION AS WHEN NECESSARY AND REVIEW AT LEAST EVERY 4 YEARS
HMIP
CONSULTATION (HSE, MAFF, NCC, NRA ETC)
ASSESSMENT
DETERMINATION
AUTHORISATION
PUBLIC REGISTER
ENFORCEMENT
MONITORING
INSPECTION

short term growth at the expense of our long term future cannot be the answer. That is why we believe that sensible and sustainable growth is the friend, not the enemy, of a cleaner greener environment.

Alongside industry's own efforts, however, there is also an important place for Government regulation. A judicious mix of private sector initiative and regulation is the way forward and will result in higher technological standards and better performance in a more environmentally demanding market. I believe the implementation of the *Environmental Protection Act 1990* will make a major contribution here. It puts into place the framework for pollution control well into the next century. The Act sets a clear framework of standards and requirements with which industry can comply and which the public can identify as positive steps towards a cleaner environment.

In the past pollution control systems in the UK have developed in response to the needs of one of the three environmental media of air, land and water. But it really does not make sense to treat the release of wastes from major processes to one of the environmental media without considering the other two. With IPC we have developed a multi-media approach to pollution control. In this we are among the leaders in Europe and the rest of the world. Indeed the European Commission is currently developing an instrument to introduce a system of IPC Community-wide. They have something to learn from us, and it will be good for British industry to be ahead of the field, in having systems suited to the IPC approach.

Integrated pollution control will require that no prescribed process can be operated without a prior authorisation from HMIP after a date specified in regulations. The processes and substances to be controlled under IPC, and the timetable for their introduction into the new system, are set out in detail in the *Environmental Protection (Prescribed Processes and Substances) Regulations 1991.* The timetable is summarised in Table 1. The prescribed processes and substances were listed in the Winter 1990 issue of *Clean Air.*

The *Environmental Protection (Applications, Appeals and Registers) Regulations 1991* determine the procedures for applying to HMIP for an authorisation, the information required by HMIP, the bodies which HMIP must consult and requirements for advertising the application and for placing relevant information in a public register. The procedure is outlined in Figure 1. The requirements for involving the public in the process are a key aspect of IPC. They reflect our philosophy that the public has a right to know about pollution issues (subject to safeguards where essential for commercial confidentiality), and I believe they reflect industry's recognition that it is essential to secure and maintain the confidence of its neighbours. HMIP is required either to grant an authorisation, subject to any conditions which the Act requires or empowers it to impose, or to refuse it. HMIP must refuse it unless it considers that the applicant will be able to carry on the process in compliance with the conditions to be included in the authorisation.

In setting the conditions within an authorisation, Section 7 of the EPA places HMIP under a duty to ensure that certain objectives are met. The conditions should ensure that:

— the best available techniques (both technology and operating practices) not entailing excessive cost ("BATNEEC") are used to prevent or, if that is not practicable, to minimise the release of prescribed substances into the medium for which they are prescribed; and to render harmless both any prescribed substances which are released and any other substances which might cause harm if released into any environmental medium;

— releases do not cause, or contribute to, the breach of any direction given by the Secretary of State to implement European Community or international obligations relating to environmental protection, or any statutory environmental quality standards or objectives, or other statutory limits or requirements.

— when a process is likely to involve releases into more than one medium (which will probably be the case in many processes prescribed for IPC), the best practicable environmental option ("BPEO") is achieved (i.e. the releases from the process are controlled through the use of BATNEEC so as to have the least effect on the environment as a whole).

The concept of BATNEEC contains an inbuilt dynamic towards higher standards because as the technology available improves, so will environmental protection standards be raised.

Process operators, and indeed the public, will require an assurance that BATNEEC is applied in a rational and consistent way. BATNEEC standards for each class of IPC process will be set out in published guidance notes, which the Chief Inspector will issue to his inspectors. Separate guidance for local authorities on processes for which they control air pollution will be issued by the Secretary of State. In preparing the Chief Inspector's guidance notes HMIP will review available techniques internationally as well as tapping industry's own expertise and experience. Right at the outset, industry, through its various representative bodies, will have an opportunity to offer views on the factors that will need to be covered in each note. And before a note is finalised it will be issued in draft for comment and discussion by all interested parties.

Part I of the Act does of course impose requirements on industry. Higher standards are, after all, the goal. But there are direct practical benefits for industry too. Industry already needs to look at all its waste streams to meet existing controls and requirements. The tendency is, however, to look at them in a sectoral way; and not all operators of industrial processes look systematically to see what savings might be made. That will not necessarily be extra work, but existing work that is more sharply focussed and better directed which ought of itself to yield efficiency gains. Industry will also benefit, under IPC, from the provision of 'one stop shopping', whereby they no longer have to deal with a multiplicity of different regulatory bodies to obtain consents for their releases to air, land and water.

In addition, I am convinced that a well founded system of regulation such as IPC will act as a spur to innovation and open up new markets for British industry in pollution abatement equipment and cleaner technology. Industry will have to meet higher standards over time, but how individual firms do so — the techniques they develop for the purpose — will be a matter for them. There will obviously be advantage in developing cost-effective techniques, and if they meet the high standards required in the UK they will also be among the best in the world.

The pollution abatement technology market is already big business — and is becoming bigger all the time. Up to two million people are already employed by the environmental industry in the countries of the European Community. The European Commission expect that number to double in the next decade. In the United States the pollution abatement sector has one of the highest growth rates. The opportunities are potentially huge — and the UK with its pedigree of sound science and engineering excellence can and must collar a bigger share. The discipline of IPC will provide a helpful stimulus.

We all care about the quality of our environment and this Government is committed to tackling head on the challenges that face us. Industry occupies a key position in relation to the environment. It generates resources and techniques to support and achieve higher environmental protection. But it also causes pollution which must be controlled by an effective system of regulation. It can and must respond to the opportunities which environmental concerns provide — and it must also act with responsibility if it is to retain the respect of the public. If industry can strike the right balance and work in partnership with the Government, it will be to the benefit of companies, customers and the environment itself.

TABLE 1: TIMETABLE FOR IMPLEMENTING INTEGRATED POLLUTION CONTROL

EPA Sched. 1 Ref	Process	Comes within IPC	Apply Between	Chief Inspector's Guidance Note Issues
	Fuel and Power Industry			
1.3	Combustion (>50MWth) Boilers and Furnaces	1.4.91	[1.4.91] & 30.4.91	1.4.91
1.1	Gasification	1.4.92	1.4.92 & 30.6.92	1.10.91
1.2	Carbonisation	1.4.92	1.4.92 & 30.6.92	1.10.91
1.3	Combustion (remainder)	1.4.92	1.4.92 & 30.6.92	1.10.91
1.4	Petroleum	1.4.92	1.4.92 & 30.6.92	1.10.91
	Waste Disposal Industry			
5.1	Incineration	1.8.92	1.8.92 & 31.10.92	1.2.92
5.2	Chemical Recovery	1.8.92	1.8.92 & 31.10.92	1.2.92
5.3	Waste Derived Fuel	1.8.92	1.8.92 & 31.10.92	1.2.92

EPA Sched. 1 Ref	Process	Comes within IPC	Apply Between	Chief Inspector's Guidance Note Issues
	Mineral Industry			
3.1	Cement	1.12.92	1.12.92 & 28.2.93	1.6.92
3.2	Asbestos	1.12.92	1.12.92 & 28.2.93	1.6.92
3.3	Fibre	1.12.92	1.12.92 & 28.2.93	1.6.92
3.5	Glass	1.12.92	1.12.92 & 28.2.93	1.6.92
3.6	Ceramic	1.12.92	1.12.92 & 28.2.93	1.6.92
	Chemical Industry			
4.1	Petrochemical	1.5.93	1.5.93 & 31.7.93	1.11.92
4.2	Organic	1.5.93	1.5.93 & 31.7.93	1.11.92
4.7	Chemical Pesticide	1.5.93	1.5.93 & 31.7.93	1.11.92
4.8	Pharmaceutical	1.5.93	1.5.93 & 31.7.93	1.11.92
4.3	Acid Manufacturing	1.11.93	1.11.93 & 31.1.94	1.5.93
4.4	Halogen	1.11.93	1.11.93 & 31.1.94	1.5.93
4.6	Chemical Fertiliser	1.11.93	1.11.93 & 31.1.94	1.5.93
4.9	Bulk Chemical Storage	1.11.93	1.11.93 & 31.1.94	1.5.93
4.5	Inorganic Chemical	1.5.94	1.5.94 & 31.7.94	1.11.93
	Metal Industry			
2.1	Iron and Steel	1.1.95	1.1.95 & 31.3.95	1.7.94
2.3	Smelting	1.1.95	1.1.95 & 31.3.95	1.7.94
2.2	Non-ferrous	1.5.95	1.5.95 & 31.7.95	1.11.94
	Other Industry			
6.1	Paper Manufacturing	1.11.95	1.11.95 & 31.1.96	1.5.95
6.2	Di-isocyanate	1.11.95	1.11.95 & 31.1.96	1.5.95
6.3	Tar and Bitumen	1.11.95	1.11.95 & 31.1.96	1.5.95
6.4	Uranium	1.11.95	1.11.95 & 31.1.96	1.5.95
6.5	Coating	1.11.95	1.11.95 & 31.1.96	1.5.95
6.6	Coating Manufacturing	1.11.95	1.11.95 & 31.1.96	1.5.95
6.7	Timber	1.11.95	1.11.95 & 31.1.96	1.5.95
6.9	Animal and Plant Treatment	1.11.95	1.11.95 & 31.1.96	1.5.95

BOILERS IN BALANCED COMPARTMENTS

Some Background to the New Provisions of BS 6644:1990

by

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Introduction

Publication of BS 6644:1990 marks a watershed in the level of recognition afforded to the particular characteristics of the vertical balanced flue chimney system by UK regulatory documentation.

Until now vertical balanced flue chimney systems have not been treated by any such documentation as substantively different to more traditional chimney systems. In domestic applications the building regulations have specifically controlled the positioning etc. of very small through-the-wall balanced flue units, but in the larger industrial and commercial sizes vertical balanced flue systems have been subject to control primarily through the Clean Air Acts. The main purpose of this legislation was to address the problems of dark smoke and the dispersion of combustion products. Although the Department of Environment (DoE) has proposed changes in the requirements for very large systems there are no proposed changes in the legislation for installations of less than 20 MW capacity. However these smaller installations are where most vertical balanced flue chimney systems are used and thus BS 6644:1990 which specifies the British Standard for "Installation of gas-fired hot water boilers of rated inputs between 60 kW and 2 MW (2nd and 3rd family gases)" represents a major new development in that it makes specific provision for "Balanced-Compartments" as used in the vertical balanced flue chimney system. The new Standard is significant in that for the first time it presents the vertical balanced flue alongside and on equal terms with other more traditional flueing and chimney arrangements.

The main physical characteristic of the vertical balanced flue chimney system, or "balanced-compartment" as it is described by the new standard, is that combustion and ventilation air is *". . .supplied and discharged by means of a purpose designed (or proprietary) flueing/ventilation system based solely on high level permanent openings situated immediately adjacent to the flue outlet."* [1] This arrangement makes the system *". . .particularly suitable for boiler installations which are not adjacent to an outside wall, where provision of high and low level ventilation is difficult because of structural arrangements or where a vertical balanced flue condition is required to avoid flueing problems."* [2] The Standard also suggests that *"the termination of the flue in a balanced compartment installation is not as critical as with an individual open flue installation. . ."* [3]

The purpose of this paper is to address the question of why the vertical balanced flue chimney system has started to move inwards from the periphery of regulatory consideration, and to examine its particular characteristics and possible advantages when compared to other chimney systems.

Comparisons With Other Chimney Systems

One very easily compared feature of different chimney systems is the visual impact they have on their setting. Chimneys have been an important feature of many buildings for centuries. Sometimes the architectural aesthetic has embraced their qualities and as a result they have formed an integral and visually pleasing part of the overall design. When this has not been the case the results have also not been pleasing. A chimney can be somewhat uncompromising. Its function has often dictated that it be tall and straight, with the result that if such a shaped element is not included in the aesthetic, its disturbing visual impact is difficult to avoid, whatever superficial techniques are used to disguise its presence.

In some industrial regions it used to be that chimneys were probably the most memorable feature of the built environment. This is no longer the case partly because their numbers have actually decreased but also because legislation has forced them to be built in such a way as to maximise dispersion of smoke etc. and so improve the environment in their immediate surroundings. One of the main aims of the Clean Air Acts was to dispel the effects of smoke and smog from cities. This has improved the air we breathe but it has also made us more aware of our visual environment. So it is now required that buildings be visually acceptable as well as functional.

So far as domestic installations are concerned the through-the-wall balanced flue unit has already substantially freed architects from the need to include tall chimneys into their designs. And for industrial and commercial sized installations the vertical balanced flue chimney system can now fulfill a similar role because it can often be sited in such a manner that is is invisible from ground level. This option of minimising the visual impact of a chimney system can be especially important when installing new boilers and flues in existing buildings.

The comparisons that remain to be made are all concerned with the chimney systems function, and in these comparisons it is important to consider the whole of the air supply, combustion and flueing arrangements together as one complete system. The purpose of the whole system is to allow the efficient combustion of fuel and to transfer as much as possible of the heat released through into the boiler. This general statement can be developed into a number of specific requirements which include the following:

1. It is important to supply the correct amount of air for combustion. Any deviations from the correct amount can adversely affect combustion conditions, increase emissions of undesirable combustion products, and lower the system efficiency.
2. The boiler compartment must be ventilated to prevent a build up of excess heat and to remove any fumes or flue gases that escape through joints or that are blown back through the draught diverter.
3. The temperature of the hot flue gases should be no higher than is required to prevent condensation inside the flue and to maintain sufficient draught for continued combustion. These hot gases are discharged to atmosphere and therefore represent wasted energy and reduced efficiency. A corrolary of this is that heat transfer to the surroundings through the flue walls should be minimised by appropriate insulation.

Each of these requirements can form a basis for comparison between the different types of chimney system.

1. Combustion Air Supply

Combustion is a chemical reaction which releases energy by oxidising a fuel. The amount of energy released and the chemical composition of the combustion products depends on the particular fuel used and on the exact conditions in which the combustion takes place. One way to preclude the occurrence of certain pollutants in the waste products is to choose a fuel with the right chemical composition. For example the combustion of non-sulphur-bearing fuels does not produce sulphur dioxide or sulphur trioxide.

Reduction of other undesirable waste products can be achieved by appropriate control of combustion conditions. Some of the major factors which define combustion conditions are: amount of excess air; flame temperature; mixing patterns; and residence time; and the main pollutants present in combustion products are; carbon dioxide; carbon monoxide; nitrogen oxides; sulphur oxides; carbon and unburnt hydrocarbons. (Sometimes referred to as COx, NOx, SOx, and rocks.)

Chimney system design influences combustion conditions principally because of the relationship between chimney height and the amount of draught produced. Draught determines the amount of air drawn into the combustion system and therefore affects excess-air-ratio. Reaction temperature, mixing pattern and residence time will also be affected accordingly. If too little air is provided for combustion then combustion will be incomplete and carbon monoxide, unburnt hydrocarbons and maybe even some carbon will be present in the flue gas. Moreover, because combustion is incomplete the full calorific value of the fuel will not be realised, so combustion efficiency is reduced. Emissions of carbon monoxide, unburnt hydrocarbons, and carbon (i.e. smoke) can be effectively eliminated by supplying more air than is really required. But beyond a certain point this approach has two main disadvantages; firstly, all the excess air has to be heated up to flue gas temperature, which uses some of the heat released in combustion and therefore reduces boiler efficiency; and secondly, the ready availability of oxygen in the high temperature combustion zone promotes the formation of nitrogen oxides.

The ideal situation is for just enough air to be supplied to ensure good mixing and complete combustion. If this can be achieved, it will eliminate emissions of carbon monoxide, unburnt hydrocarbons and carbon; and allow the full calorific value of the fuel to be put to good purpose without throwing any more heat away up the chimney than is absolutely necessary. It will also result in less nitrogen oxides production than if an excessive amount of excess air were used. An additional benefit of improved boiler efficiency is that the required heating effect can be obtained from less fuel, which means a real reduction in the amount of carbon dioxide generated. [4]

Supply of just the right amount of air requires a stable amount of draught. Forced draught burners are common in the larger sizes and relatively insensitive to the natural draught generated by the chimney. But in the smaller sizes, which are of most interest to us at present, atmospheric burners are extremely popular and are subject to the natural draught generated by whatever flueing arrangement is used.

With a traditional chimney system design there can be problems in trying to provide fully stable draught conditions because wind conditions at the top of the chimney are rarely the same as those lower down where the combustion air is drawn in. Either too much or too little air can be drawn through the system. Actual downdraught is when the flow is reversed and the flue gases are emptied back into the boiler compartment. The common response to the problem is to use a chimney that is tall enough to almost always be capable of generating more than the required minimum draught, and to fit some sort of stabilising device to limit the amount of excess draught to less than an acceptable maximum. Unless draught is regulated by using fully modulating dampers (as is particularly recommended for high-sulphur fuels [5]) then draught limitation relies on introducing relatively cold air at the base of the chimney, which cools the flue gas and has an obvious adverse effect on its buoyancy during its final dispersion in the atmosphere. When subjected to actual downdraught the aim of a draught diverter is simply to maintain the continuance of combustion rather than to maintain precise combustion conditions. However, the balanced flue completely avoids the possibility of these problems by placing the air intakes immediately adjacent to the flue gas exit so that they always experience generally the same pressure whatever the wind conditions. The balanced condition eliminates any fluctuations in draught even under very severe conditions. Independent tests of a Monodraught vertical balanced flue system by Dobeta in 1982 concluded that

> *". . .the design of the Monodraught/boiler house arrangement was able to overcome the effects of downdraught under the most arduous wind conditions and did create the correct environment to allow the boiler to operate without any deterioration in its combustion performance throughout the series of tests. The balanced-flue arrangement therefore of the Monodraught system in allowing the boiler operation to continue at optimum performance totally unaffected by external wind conditions, was seen to be proved. . ."* [6]

The Dobeta tests show that a Balanced-Compartment allows combustion conditions to be maintained independent of the outside ambient wind conditions, and it is therefore possible to fine-tune the amount of air supplied to just the right amount to minimise emissions of all types of pollutant simultaneously.

2. Boiler Compartment Ventilation

Boiler compartments are commonly ventilated by a combination of high level and low level openings communicating directly with the outside air. The low level openings are intended to admit fresh air and the high level to allow the egress of hot air from near the ceiling of the compartment. However it is possible for the low level openings to become blocked, sometimes deliberately; sometimes as a result of ignorance by a well meaning caretaker; and sometimes accidently by leaves or waste paper. It is also possible to admit very dirty air and dust and for the combustion air to pick up contaminants from ground level as it crosses the boiler compartment floor.

A balanced-compartment only communicates with the outside atmosphere via the four air ducts that surround the flue. These ducts not only admit the air required for combustion but also form a ventilation system which has some similarities with the wind towers of traditional Middle Eastern architecture. Ventilation flow is caused partly by the internal-to-external temperature differential and partly by the effects of wind causing a static pressure difference between the air duct openings on windward and leeward sides of the rooftop unit. Air drawn into the compartment from high level is cleaner than from low level and there is much less possibility of the openings becoming blocked. But so far as ventilation is concerned, the main advantage of the balanced-compartment is that it eliminates the possibility of flue gases contaminating the boiler compartment as a result of downdraught.

Under severe downdraught conditions the flue gases contained in a conventional chimney system can be blown back down the flue and the function of the draught diverter is to protect the boiler and prevent combustion being snuffed out by diverting these combustion products out into the boiler compartment. Thus a true downdraught situation would cause combustion products to be emptied directly into the boiler compartment. This major cause of boiler compartment contamination is completely eliminated with the balanced-compartment because downdraught cannot occur. Tests have confirmed negligible levels of pollutants measured inside a boiler compartment fitted with a monodraught vertical balanced flue chimney system. [7]

3. Flue Gas Temperature

The discharge of hot gases to atmosphere represents wasted energy and reduced efficiency. But apart from any consideration of whether waste heat recovery (such as in condensing boilers) would be worthwhile, there are two elementary reasons for maintaining flue gas temperature above a certain minimum. Firstly there is the need to avoid condensation within the flue, and secondly it is the high temperature of the flue gas that gives it the buoyancy which produces the chimney systems natural draught.

To prevent condensation, the flue gas exit temperature must be above a certain minimum temperature, which means that it must enter the flue from the boiler at a somewhat higher temperature, dependent on the amount of heat it will lose on its way up the flue. Each 20°C of heat loss from the flue requires a 20°C higher boiler exit temperature and represents a one per cent loss in boiler efficiency. [8] Thus it is clear that optimised efficiency is best served by providing the draught required by use of a short highly insulated flue rather than a tall badly insulated one.

In order to draw any distinction between the conventional chimney system and the vertical balanced flue chimney system in this respect, it is necessary to return to the phenomenon of downdraught. The conventional chimney system requires extra height to combat this phenomenon. Extra height means extra heat loss, and this demands higher flue gas entry temperatures from the boiler and an attendant loss of efficiency. Alternatively, extra insulation could be provided. But either response compares badly with the naturally short and highly insulated flue which is used in the balanced-compartment design. A further advantage of the short highly insulated flue is that it does not suffer from the standby losses which are associated with tall conventional chimneys. Because it remains at a fairly high temperature in between boiler firing cycles, it reaches proper working temperature very quickly, reduces warm-up time, and so improves overall operating efficiency.

Conclusion

The foregoing comparisons have come out very much in favour of the vertical balanced flue chimney system and the balanced-compartment. This is as one might expect considering that our aim was to examine some of its particular characteristics and possible advantages, but it would be wrong to conclude without considering what have been the objections to the system and their validity.

Because of its lack of obvious vertical height, it has sometimes been suggested that the vertical balanced flue chimney system does not comply with the requirements of the Chimney Heights Memorandum of the 1956 Clean Air Act [9]. However it is undoubtedly subject to these requirements just as are all other types of chimney system [10]. Also, just as with other systems, there are some situations or installations that do not fall neatly in with the procedures laid out in the Memorandum. This possibility is recognised in the Memorandum itself [11]. For guidance in these cases one obvious course of action would be to refer to the technical basis for the requirements as suggested for further reading in paragraph 31. [12] But in fact this technical basis has never been published. It is therefore impossible to enter into intelligent debate on specific requirements, and to consider how best to comply with their spirit in obscure cases without the necessary background information. It only remains for the prospective system designer to satisfy the appropriate Environmental Health Officer and their advisors about each installation on an ad hoc basis, and to hope that the example of recognition afforded by the new British Standard 6644:1990 will be carried through to whatever eventually updates or supersedes the present requirements of the Clean Air Acts.

References

1. BS 6644:1990 19.1.2(b).
2. ibid. Commentary and Recommendations on 19.2.6.
3. ibid. Commentary and Recommendations on 20.5.1.
4. SCOT Engineering report no. CR/151090/SJS. Salford College of Technology, Salford 1990.
5. CIBSE Guide B13-27.
6. Dobeta Test Report No. 827. paragraph 0.10. 1982.
7. BSRIA Report No. 2 Contract 3674. section 4.2. 1984.
8. "The thermal efficiency of large oil fired boilers" W.A. Don, D.C. Walker, R. Rayment. Building Research Establishment Report 1989, Appendix B.
9. Chimney Heights. Third edition of the 1956 Clean Air Act Memorandum HMSO London 1981.
10. "Air pollution aspects of room-sealed boiler flue systems" D.J. Hall, CLEAN AIR, Vol. 17, No. 3/4, 1987.
11. op.cit. (9) paragraph 29.
12. op.cit. (9) paragraph 31.

FEAT: REMOTE SENSING OF VEHICLE EXHAUST EMISSIONS

An Investigation into the Remote Sensing Method of the University of Denver, and its Potential Application in the United Kingdom

by

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This paper was originally prepared for the Royal Automobile Club; the method of vehicle testing described was subsequently used in their study of car pollution the results of which were summarised in *Clean Air,* Winter 1990. We are grateful to the RAC for permission to publish this paper.

Introduction

Road traffic is the largest source of carbon monoxide. In the UK about 85 per cent of the nation's emissions come from this one source and the World Health Organization's 8-hour guideline was exceeded on 27 days in central London last year. In the United States the National Ambient Air Quality Standard for carbon monoxide is exceeded in about 50 cities where 29 million Americans live.

New cars have to meet stringent emission limits for carbon monoxide, hydrocarbons and nitrogen oxides. New models are tested using test cycles. In the United States, the Federal Test Procedure is designed to represent typical summer-time driving in Los Angeles.

Stringent emission controls over new cars will only go some way to solving urban air quality problems. There must also be some way of ensuring that low levels of pollution are emitted from the range of vehicles in use on the roads.

Measuring emissions from the exhaust of cars in-service is extremely difficult using conventional gas analysers. Methods have been devised for on-board sampling but have been used only for research purposes. These methods cannot be used for random checks of vehicles on the road. In some areas in the United States the local Air Resources Board has the authority to undertake random roadside testing of vehicles for emissions. In California, for example, exhaust emissions of carbon monoxide and hydrocarbons as well as engine speed are measured at slow and fast idle speeds. A visual inspection is also included to check for obvious tampering with the engine and emission control equipment. Compliance is determined on the basis of the age and type of vehicle.

In the United States, in areas where the air quality standard is exceeded, regular "inspection and maintenance programmes" (I/M) have been adopted to ensure that all cars have a regular test of their emissions. In the United Kingdom emission testing is to be included in the annual MOT test from November 1991. An emission limit of 4.5 per cent carbon monoxide has been set. Catalyst equipped cars will emit considerably lower levels than this.

Inspection and Maintenance Programmes

There is a wide variation among the I/M programmes in the United States. However, usually the tests are performed annually (or biennially), and incorporate an idle or fast idle component. The most sophisticated I/M testing programmes use a chassis dynamometer with one or two fixed loads and speeds and measure the steady state emissions as a per cent of exhaust. In California, for example, the I/M programme, called Smog Check, is required every two years. It is performed in private garages and consists of a three-part test: a visual examination; a functional check of certain emission control systems; and an exhaust emission measurement of exhaust hydrocarbons (HC) and carbon monoxide (CO). If the vehicle passes the Smog Check the owner is issued with a Smog Check certificate which is required for vehicle registration. The major problem with this type of approach to controlling in-service emissions is that the checks are infrequent. Even responsible citizens, whose vehicles are emitting excessive amounts of carbon monoxide will, on average, drive for six months before any failure of the engine/emission control system is detected. Less responsible owners know how to adjust their vehicles to pass the test and to adjust them back afterwards. In the United States a study of idle speed emissions of over 600 vehicles found no correlation between emissions and how recently they had been for their I/M test. Another study of a similar number of vehicles that had failed their annual test, the process of driving them around the block and retesting them allowed more than 200 to pass.

Passing the Inspection and Maintenance test does not necessarily mean the vehicle is a low polluter. It only means that the vehicle is performing as well as could be expected for its age and emission control system. Older vehicles can emit up to 7 per cent carbon monoxide at idling and still pass the test.

The Inspection and Maintenance tests are less rigorous than the Federal Test Procedure used to certify new cars.

Ideal Emissions Tests

Michael Walsh, an independent environmental consultant, who used to work for the US Environmental Protection Agency and whose clients now include local and central governments from around the world and a number of influential non-governmental organisations, has outlined the following criteria for an as yet nonexistent ideal emissions test.

The test must:

- Evaluate the vehicle under real-life conditions
- Be reproducible
- Be accurate
- Be quick
- Be cheap
- Measure all the pollutants of interest
- Be comprehensive enough to discourage testing bias.

FEAT, the system recently developed by the University of Denver and discussed in this paper meets most of these criteria. Its major limitation is that at present it only measures carbon monoxide emissions. The methods could be extended to hydrocarbons and nitrogen oxides.

FEAT (Fuel Efficiency Automobile Test)

FEAT, short for Fuel Efficiency Automobile Test, uses a remote sensor to measure CO/CO_2 ratios from passing vehicles. These ratios can be used to determine the carbon monoxide percentage in exhaust, grammes of carbon monoxide emitted per gallon of fuel consumed and whether a vehicle is running rich or not.

Method

The method uses the well established method of long-path infrared (IR) photometry. Every molecule has its own unique range of different wavelength light that it absorbs. The amount of light absorbed is proportional to the concentration of the chemical under investigation. By measuring the change in absorption of light at a particular wavelength in front of a vehicle and in the same vehicle's exhaust the CO/CO_2 ratio can be determined. The IR beam is located 10 inches (25.4 cm) above the road. The equipment was calibrated daily.

If a second vehicle enters the beam and interrupts the measurement of a previous vehicle, the software recycles and performs the measurement on the new vehicle using the values obtained from in front of the first car.

The CO/CO_2 ratio is the only measurement that can be made because the instrument cannot distinguish the magnitude or position of the exhaust plume. Pollution contribution can be determined directly from the ratio. A high ratio corresponds to a high polluter and a low ratio to a low polluter. However, most workers in the field of vehicle exhaust emissions do not report measurements in terms of CO/CO_2 ratios. Idle emission standards are usually written in terms of per cent of carbon monoxide. Thus, the researchers from the University of Denver have derived a means of converting the CO/CO_2 ratio to carbon monoxide percentage in exhaust, or grammes of carbon monoxide emitted per gallon of fuel consumed.

The advantage of these measurements is that they, unlike grammes per mile emissions (the units used in the current US Federal Standard), are independent of the vehicle transmission gear ratio and speed. Carbon monoxide concentrations measured by FEAT are most frequently reported as per cent CO, since car owners and mechanics are most familiar with the exhaust probe readings in these units carried out in conventional I/M programmes.

The infrared light source is located on one side of a roadway across from a detector unit. Usually a motorway slip road is chosen although in one location a 1 meter wide "island" was built for the detector between two lanes. A freeze frame video system is used to record the number plates of vehicles being measured and through the local Department of Motor Vehicle Records the vehicles could be identified according to make and age.

The method has been shown to have an accuracy of within 10 per cent of the directly measured exhaust value. It has also been shown to be independent of temperature when compared with on-board monitoring.

FEAT is quick: a large number of vehicles can be monitored each day. The total analysis time is less than 1 second per vehicle at speeds as high as 60 mph. Over 2,000 vehicles can be monitored on a working day.

Results

To date two studies have been reported by the University of Denver team, in addition to those used to verify the FEAT equipment. The first looked at the effect of introducing oxygenated fuels in the winter as a strategy to lower car emissions of carbon monoxide in Denver. The second in Los Angeles was a pilot study looking at remote sensing and the inspection and maintenance programme.

(a) More than 117,000 vehicle exhaust measurements were performed on warm vehicles in two locations in Denver. The results show a significant reduction in carbon monoxide with the oxygenated fuel of 16 ± 3 per cent.

(b) In both studies less than 10 per cent of the vehicles account for half the carbon monoxide emissions. Very few of these (0.3 per cent) were less than 2 years old, but a sizeable fraction were 1983 model year and newer (i.e. produced since controlled three way catalysts were required) (3-4 per cent).

(c) It is important to note that the majority of the vehicles are low CO emitters, even among 1975 and older model years. More than 70 per cent of the vehicles were measured at less than 1 per cent carbon monoxide.

(d) Although most cars emit more carbon monoxide when cold the few gross polluters pollute so much that they dominate the emissions problem even when their engines are hot. If the gross polluters are also high mileage vehicles, then their importance to the problem is even greater. New cars in Colorado are built to meet a 3.4 g/mile standard. The average car in Denver emits 50 g/mile. It is apparent that further more stringent emission limits may not improve urban air quality unless in-service vehicles become less polluting.

(e) During the two day Los Angeles pilot study twelve vehicles (less than 1 per cent) were found to have emission control systems that had been tampered with. One vehicle was found to have a petrol engine with no emission control equipment even though it had been registered as a diesel vehicle. Because the vehicle was classified as a diesel vehicle it was not subject to the regular Smog Checks. The vehicle exhaust measured a 8.1 per cent carbon monoxide level.

(f) The Los Angeles study shows that FEAT is a useful initial screening device for identifying high polluting vehicles.

Applications in the United Kingdom

FEAT appears to be a very useful tool to identify those vehicles that are high polluters. Monitoring in-use carbon monoxide emissions in the United Kingdom could also show how a small proportion of the vehicles on the roads are causing most of the problem. However, it may not be quite as clear cut as the American studies show because the use of controlled (closed loop) three way catalysts is insignificant at present in this country.

Only 0.04 per cent of the new cars sold in the UK in 1989 had catalytic converters. Car emission limits (assuming the consolidated directive is adopted) from the end of 1992 will be 10-20 per cent of the levels permitted in the early 1970s for new cars. Present models, assuming they are built to Regulation 15.04 (they generally will be but it is not mandatory) will be built to emission standards about half of those permitted in the early 1970s. Initial tests at the Warren Spring Laboratory suggest that cars with catalysts actually emit 90 per cent less carbon monoxide than those built to the 15.04 regulations.

However, the use of such monitoring could be used to:

(a) Identify how evenly spread the pollution burden is.
(b) Prove how effective closed loop three way catalysts are in controlling emissions of carbon monoxide in use.
(c) Look at the effect of vehicle maintenance on carbon monoxide levels.
(d) Look to see whether the 4.5 per cent carbon monoxide in-service limit could in fact be tightened say for vehicles built to UN-ECE regulation 15.04.

References

1. IR Long Path Photometry: A Remote Sensing Tool for Automobile Emissions, G.A. Bishop, J.R. Starkey, A. Ihlenfeldt, W.J. Williams, D.H. Stedman, *Analytical Chemistry,* Volume 61, p671A, 1989.

2. Automobile Carbon Monoxide Emissions, D.H. Stedman, *Environmental Science and Technology,* Volume 23, p147-148, 1989.

3. On-Road Carbon Monoxide Emission Measurement Comparisons for the 1988-1989 Colorado Oxy-fuels Program, G.A. Bishop and D.H. Stedman, *Environmental Science and Technology,* Volume 24, p843-847, 1990.

4. Emissions From In-use Motor Vehicles in Los Angeles: A Pilot Study of Remote Sensing and the Inspection and Maintenance Program, D.R. Lawson, P.J. Groblicki, D.H. Stedman, G.A. Bishop, and P.L. Guenther, *Journal of the Air and Waste Management Association,* August 1990.

UPDATE

AIR POLLUTION PG NOTES

Process Guidance Notes covering a number of processes requiring authorisation by local authorities following implementation of Part I of the Environmental Protection Act 1990 from 1 April 1991 have now been published (see below). Most of those listed are now being finalised, with comments on those marked * required by the end of March. Copies of the final versions are to be circulated to all local authorities with additional copies, individually priced, available from HMSO.

PG 1/1(91) Waste Oil Burners, less than 0.4 MW net rated thermal input
PG 1/2(91) Waste Oil or Recovered Oil Burners, up to 3 MW net rated thermal input
PG 1/3(91) Boilers and Furnaces, 20-50 MW net rated thermal input
PG 1/4(91) Gas Turbines, 20-50 MW net rated thermal input
PG 1/5(91) Compression Ignition Engines, 20-50 MW net rated thermal input
PG 1/6(91) Tyre and Rubber Combustion Processes, between 0.4 and 3 MW net rated thermal input
PG 1/7(91) Straw Combustion Processes, between 0.4 and 3 MW net rated thermal input
PG 1/8(91) Wood Combustion Processes, between 0.4 and 3 MW net rated thermal input
PG 1/9(91) Poultry Litter Combustion Processes, between 0.4 and 3 MW net rated thermal input
PG 2/1(91) Furnaces for the Extraction of Non Ferrous Metal from Scrap
*PG 2/2(91)** Hot Dip Galvanising
*PG 2/4(91)** Iron, Steel and Non Ferrous Metal Foundries
*PG 2/5(91)** Hot and Cold Blast Cupolas
*PG 2/6(91)** Aluminium and Aluminium Alloy
*PG 2/7(91)** Zinc and Zinc Alloy
*PG 2/8(91)** Copper and Copper Alloy
PG 3/1(91) Blending, Packing, Loading and Use of Bulk Cement
PG 3/2(91) Manufacture of Heavy Clay Goods and Refractory Goods
PG 3/3(91) Glass (excluding Lead Glass) Manufacturing Processes
PG 3/4(91) Lead Glass Manufacturing Processes
*PG 3/5(91)** Coal, Coke and Coal Products
PG 3/6(91) Processes for the Polishing or Etching of Glass or Glass Products using Hydrofluoric Acid
*PG 3/7(91)** Exfoliation of Vermiculite and Expansion of Perlite
*PG 3/9(91)** Sand Drying and Cooling
*PG 3/10(91)** China and Ball Clay
PG 5/1(91) Clinical Waste Incineration Processes under 1 tonne per hour
PG 5/2(91) Crematoria
PG 5/3(91) Animal Carcase Incineration Processes under 1 tonne per hour
PG 5/4(91) General Waste Incineration Processes under 1 tonne an hour
PG 5/5(91) Sewage Sludge Incineration Processes under 1 tonne an hour
PG 6/1(91) Animal By-Product Rendering Processes

PG 6/2(91) Manufacture of Timber and Wood Based Products
PG 6/3(91) Chemical Treatment of Timber and Wood Based Products
PG 6/4(91) Processes for the Manufacture of Particleboard and Fibreboard
PG 6/5(91) Maggot Breeding Processes
PG 6/6(91) Fur Breeding Processes
*PG 6/9(91)** Manufacture of Coating Powder
*PG 6/12(91)** Sausage Casings, Tripe, Chitterlings, Green Offal

REGISTRATION OF WASTE CARRIERS

The Department of Environment has published proposals for regulations which will allow the registration of carriers of controlled waste and seizure of vehicles involved in fly-tipping.

The regulations, which will implement the *Control of Pollution (Amendment) Act 1989*, are a first step in the implementation of the duty of care contained in section 34 of the *Environmental Protection Act 1990*. The main features of the system of registration which it is proposed to adopt are:

Scope: The proposed regulations will require each waste regulation authority to establish and maintain a register of carriers. Each carrier will be required to register with the authority for the area in which his principal place of business is situated. On acceptance, his registration will be valid throughout Great Britain;

Duration: Each carrier's registration will last for three years;

Refusal: A regulation authority will be able to refuse or revoke registration if the carrier or another relevant person has been convicted of a prescribed offence and, in the authority's opinion, it is undesirable for the carrier to be authorised to transport controlled waste.

Exemptions: Certain types of carrier will be exempted from the requirement to register. For example, producers in relation to the transport of waste which they have produced;

Charges: Regulation authorities will be required to charge for their consideration of applications for registration and its renewal. The consultation paper invites comments on the level at which the charges should be set;

The register: The registers maintained by regulation authorities will contain each carrier's application and entries listing other relevant information. Registers will be open to inspection free of charge by members of the public and must be indexed to enable information to be readily traced;

Timetable: The 1989 Act and the proposed regulations will be brought into force in two stages. The first stage will come into force in May 1991 and will enable carriers to apply for registration. It is proposed that the second stage should come into force at the same time as the duty of care in April 1992. At that stage, it will become an offence to transport waste without registering and a carrier may be stopped and required to produce his certificate of registration.

The draft regulations also set out the procedure under which an authority will be able to apply for a warrant to seize a vehicle believed to have been used in the illegal disposal of waste. The purpose of this procedure is to aid the detection and prosecution of those involved in fly-tipping.

HGV SPEED LIMITS

The Department of Transport is proposing to require speed limiters to be fitted to all new HGVs. While the current proposal is that limiters should only be required on new HGVs over 7.5 tonnes gross vehicle weight registered after 1 August 1992, the possibility of retrospection is not ruled out for the future. Limiters would be required to comply with BSAU217: Part 1a:1987. Whilst the proposals are being made mainly on safety grounds and the fact that evidence shows that well over 40 per cent of all HGVs break motorway speed limits, the DoT note the environmental benefits of such a move, because of fuel savings. Current estimates show that the annual CO_2 saving if all 1989 registered vehicles had been fitted with limiters would be worth some 60,000 tonnes. This would represent an annual saving approaching 0.5 million tonnes once the entire fleet had been fitted with limiters.

NSCA has written in support of the DoT's current proposals but has expressed a hope that early consideration will be given to fitting existing vehicles on the road with speed limiters.

NEW HMIP HEAD

Dr. David Slater is to succeed Dr. Frank Feates as Director and Chief Inspector of HMIP on 1 May. The appointment will be for an initial period of five years.

Dr. Slater is a professional chemist and chartered engineer. After graduating from the University College of Wales, and a period of teaching in Imperial College London, he became a chemical engineering consultant. He was a founding Director of Technica Limited, a major international scientific and engineering consultancy, set up to concentrate on environmental and chemical risk issues. Since 1987 he has run the company's US subsidiary.

MORE STAFF FOR HMIP

Environment Minister, David Trippier, has announced that HM Inspectorate of Pollution has been allocated over 80 new posts to help meet its new responsibilities under the Environmental Protection Act: HMIP is responsible for implementing Integrated Pollution Control (IPC) of major industrial plants, and audit of the performance of local waste regulation authorities.

The announcement authorises an increase of 248 (from 223) by 1 April, and to over 300 by 1 April 1992. The Minister also said that the complement may need to be increased further as IPC is progressively implemented and HMIP's workload increases further. Provisional assessments suggest that HMIP may ultimately require up to 400 staff when IPC is fully implemented.

RADON COUNCIL

The Radon Council is being set up to provide a link between organisations and companies involved in radon sampling and monitoring, manufacturers of remedial equipment and those carrying out remedial work. As a first step, the Council is planning to develop a code of practice/good conduct setting out the action to be taken when high levels of radon are detected and covering approved procedures for dealing with the problem, and approved contractors. For more information contact The Secretary, Radon Council, Terminal House, Station Approach, Shepperton, Middlesex TW17 8AS. Tel: 0932 221212.

NOISE STANDARD

The revised version of BS4142 — method for rating industrial noise affecting mixed residential and industrial areas — has now been published. This revision brings the standard into line with ISO 1996 and gives a method for determining the noise level, together with procedures for assessing whether the noise is likely to give rise to complaints from people living in the vicinity.

To explain the changes which have been made to the standard, BSI are holding a seminar at the Royal Aeronautical Society, London, on 18 April. The seminar will also provide an opportunity to hear the viewpoints of a noise consultant, an EHO and the Department of Environment. For further details contact Pamela Danvers at BSI, Tel: 0908 220022. (BS4142: 1990, is available from BSI, Milton Keynes MK14 6LE.)

MEASUREMENT OF AIR POLLUTION, BS1747

The above BS, published in January details the Determination of the Mass Concentration of Sulphur Dioxide in Ambient Air: Tetrachloromercurate (TCM) Pararosaniline Method. The standard is identical with ISO6767: 1990; it describes a spectrometric method for the determination of the mass concentration of sulphur dioxide in ambient air in the range of 20 μg/m^3 to about 500 μg/m^3. The standard outlines procedure for selecting apparatus, methods of sampling and for the expression of results and the construction of the test report. Copies of the standard are available from BSI Sales, Linford Wood, Milton Keynes MK14 6LE, Price £24.70 (non-members), £12.35 (members).

INVESTIGATION INTO POLLUTION AND DISEASE

The Department of the Environment has commissioned the Small Area Health Statistics Unit (SAHSU) to investigate the incidence of mortality and cancer in the vicinity of five industries: chemical waste incineration; benzene works; municipal waste incinerators; vinyl chloride works; and coke works and smokeless fuel plants. SAHSU, which is government sponsored and was set up in 1987 is expected to report in Autumn 1991.

LITTER

As from 13 February local authorities can issue fixed penalty notices for anyone who drops litter. Offenders will be issued with a notice allowing 14 days for payment of a £10 fine. Non-payment will be liable to prosecution and a fine of £400-£1000.

VOC PROTOCOL

A meeting of the UN Economic Commission for Europe working group on volatile organic compounds took place at the end of January to try to finalise the text of the draft Protocol aimed at reducing VOC emissions by 1998 or 2000. The Protocol to be agreed under the Convention on the Long Range Transport of Air Pollution aims to reduce the formation of photochemical oxidants — in particular ozone.

However, agreement has yet to be reached on exactly how reductions should be calculated. The Netherlands, Sweden and France favour reductions of at least 30 per cent on a base year to be specified by individual countries. Czechoslovakia, among others, suggests VOC emissions should be frozen at 1990 levels after the year 2000. The UK has put forward a proposal that priority should be given to setting emission limits on those VOCs with the highest photochemical ozone creation potential: the UK suggests these would include alkenes, aromatic compounds and aldehydes. The USA, however, wants emission limits based on "achieving national tropospheric ozone standards determined by each member country".

It is hoped that the Protocol will be ready for signature by November 1991.

NEW CAR STANDARDS

At their meeting in December, European Environment Ministers agreed tough new emission standards for all cars; new cars will be required to comply with the standards by 1 January 1993, and new model cars by 31 July 1992. The standards (see below), which have to be adopted by the European Parliament, will necessitate petrol driven cars being fitted with three-way catalytic converters, with diesel engines requiring "state of the art" technology. Ministers also invited the European Commission to bring forward proposals for even tighter emission standards within the next two years:

Type approval limits: CO 2.72g/km; HC + NOx 0.97g/km; particulates 0.14g/km.

Conformity of production limits: CO 3.16g/km; HC + NOx 1.13; particulates 0.18g/km.

CLEANER CAR INCENTIVES

Plans by the German Government to offer tax incentives to people buying diesel cars which are considerably cleaner than EEC requirements have fallen foul of the European Commission. As mentioned above, Environment Ministers have agreed a particulate emission limit of 0.14g/km of exhaust gases. Germany however wanted a limit of 0.08g/km and claims that nine European car manufacturers will shortly be able to meet this limit. However, the Commission feels that the German plan contravenes Article 30 of the Treaty of Rome on unfair trade barriers by favouring the purchase of specific diesel cars.

CFC AGREEMENT

European Community Environment Ministers have agreed a Regulation setting a new timetable for phasing out the production and use of ozone depleting chemicals. Ministers agreed a tighter timetable than that agreed at the review meeting of the Montreal Protocol (see *Clean Air*, Summer 1990). The timetable agreed by EEC Ministers is as follows:

Chlorofluorocarbons: using a baseline year of 1986, 50 per cent cut by 1 January 1992, 85 per cent by 1 July 1995, and complete phase out by 1 July 1997.

Halons: production and use to be frozen at 1986 levels from 1 January 1992, followed by 85 per cent reduction by 1 January 1995 and complete phase out by 1 January 2000.

Carbon tetrachloride: using a baseline year of 1989, 50 per cent cut by 1 January 1992, 85 per cent by 1 January 1995 and complete phase out by 31 December 1997.

Limited exemptions to the above timetable will be allowed where substitutes have not been found for essential uses such as medical aerosols and fire fighting equipment.

WHO COMMISSION ON HEALTH AND ENVIRONMENT

The past few years have witnessed growing public awareness of the global environmental crisis.

In response to this need, the Director-General of WHO has established a high-level, technical expert commission on health and environment, to make an inventory of what is known and what is not known, and to recommend where more research is needed.

The Commission has 22 members from 17 countries and is chaired by Madame Simone Veil of France, former Minister of Health and former President of the European Parliament.

The Commission's objectives are:

- to describe the main environmental determinants affecting human health;
- to identify the impact on health of exposure to these environmental determinants and to assess the causal relationships;
- to indicate trends over the next two decades, taking into account new technologies;
- to identify the research needed to understand and predict adverse impacts on health.
- to suggest general strategies for WHO and for the world community to prevent or mitigate the most serious adverse effects of the environment on health.

The Commission is assisted by specialist panels that consider and report on the problems of health and the environment in the fields of energy production and use, food production and agriculture, industry and urbanization.

The reports, together with separate papers on such cross-cutting issues as population, transport, noise, and ethical problems will form the basis of the report that the Commission expects to be available in time for the 1992 United Nations Conference on Environment and Development in Brazil (*World Health Forum, Vol II, 1990*).

FOREST DAMAGE

The third annual inventory of forest health published by the European Commission shows that 10 per cent of EEC forests in 1989 show some signs of damage — that is, they have lost more than 25 per cent of their leaves or needles. Discoloration was also observed in 16 per cent of the trees surveyed. Although it is clear that some of the damage can be attributed to atmospheric pollution, it is felt that more information on pollutant levels at specific sites is needed before being able to give an accurate assessment of the relationship between forest damage and pollution.

US CLEAN AIR ACT

Tough new pollution controls are included in the new US Clean Air Act which was signed into law in November 1990; the new law updates the 1977 Clean Air Act and aims to reduce emissions of those pollutants responsible for acid rain by 50 per cent by the year 2000. The Act also aims for 40 per cent reduction in vehicle exhaust emissions, and 75 per cent reduction in emissions from the chemical industry.

BOOKS AND REPORTS

THE POTENTIAL EFFECTS OF CLIMATE CHANGE IN THE UK

HMSO, 1991. Price £8.50. ISBN 011 752359 3.

The first report by the UK Climate Change Impacts Review Group was published in February. The report — The Potential Effects of Climate Change in the United Kingdom — covers twelve environmental and socio-economic sectors; it shows a range of sensitivities to climate change with soils, water and natural flora and fauna likely to be most adversely affected, while some socio-economic areas might actually benefit.

The report adopted a "Business-as-Usual" scenario of increases in greenhouse gas emissions compatible with that of the Intergovernmental Panel on Climate Change (IPCC) and complements the recent worldwide assessment of the impact of climate change made by the IPCC by providing a purely UK viewpoint.

The report points out the many uncertainties that remain, but says there is sufficient indication of potential change to our society, agriculture and natural ecosystem to give added impetus to efforts to finalise the Climate Change Convention negotiations being held in Washington.

The UK Climate Change Review Group was set up by the Department of Environment to provide an independent assessment of climate change and its potential impacts, to identify the critical uncertainties and unknowns limiting our ability to estimate and respond to such impacts and to recommend future research strategies and policy issues.

FORESTS AND SURFACE WATER ACIDIFICATION

Available from Miss J. Thomas, Department of the Environment, Air Quality Division, Room B356, Romney House, London SW1P 3PY.

A report, jointly commissioned by the Department of the Environment and Forestry Commission, and published in February, has concluded that for certain areas of the United Kingdom, forests can contribute to overall acidification of the environment. The report was prepared by a number of freshwater and forestry scientists under the chairmanship of Dr. S. Warren of the Water Research Centre.

The authors identify the importance of defining and qualifying critical loads for UK upland areas both for evaluating future emission reduction strategies and for forestry purposes. The issues are already being addressed by the Critical Loads Advisory Group (CLAG) set up by the Department of Environment. It says that further refinement of the estimates of deposition in high rainfall and high altitude areas and by dry deposition pathways are also needed if an accurate quantification of the scavenging role of trees is to be obtained. It is recommended that further measurements and monitoring should be undertaken in these areas and incorporated wherever possible into existing monitoring procedures and measurements.

Biological effects on soils and surface waters due to acidification are observed in those areas of high deposition where the soil and bedrock have a low acid-neutralising capacity (e.g. parts of central and SW Scotland, SW Cumbria, the Pennines and central and N Wales). In areas of low deposition, such as NW Scotland, biological effects seem to be minimal, whether or not the catchment is forested, even where rainfall is high and acid neutralising capacity is low. In the absence of deposition it seems therefore that forests alone do not acidify soils and waters sufficiently to cause biological damage. The report concludes, however, that closed forest canopies enhance the capture of acidic deposition from the atmosphere, particularly in the form of particles and mist droplets. In areas above about 300m in altitude, where cloud, mist and fog are common, it has been estimated that forest cover can increase the loads of sulphur and nitrogen deposited by up to 50 per cent and 100 per cent respectively.

Additional information on the consequences of reduced emissions and deposition for surface water chemistry is also required. The value of the National Acid Waters Monitoring Network now into its second year of operation and run by the DOE is recognised in this connection. Long-term detailed afforested catchment studies should also be undertaken and exisiting studies continued, especially to evaluate the effects on biological systems of the potential decrease in acid deposition and to quantify the effects of afforestation on surface water acidification in order to improve the accuracy of deposition models.

The Forestry Commission has already taken the initiative in agreeing a revision of the Forest and Water Guidelines with the National Rivers Authority as recommended by the Review Group.

ACID POLITICS

S. Boehmer-Christiansen, J. Skea. Belhaven Press, 1991. £39.50. ISBN 1852931167.

An illustration of the broad range of factors which shape and constrain the environmental policy process, taking acid pollution as its point of reference. The situation in Britain, where there is little political interest in the environment, is compared with that in Germany, where environmental matters have held a powerful influence for many years.

PLANNING AND INDUSTRIAL NOISE POLLUTION

S. Mclaughlin, C. Wood. Dept. of Planning and Landscape, University of Manchester. 1990. £3.00.

An examination of the contribution that land use planning can make to the control of industrial noise. The report covers noise measurement, the role of the environmental health department in industrial noise control and the need for planning powers in conjunction with them. Case studies are included, along with suggestions for improvement in planning legislation.

REVIVING THE CITY — TOWARDS SUSTAINABLE URBAN DEVELOPMENT

T. Elkin. D. McClaren, M. Hillman. Friends of the Earth, 1991. £12.95. ISBN 090596683X.

The demand the city makes on resources and the local and global environment are examined in this study by Friends of the Earth and the Policy Studies Institute. Urban environmental problems are put in a social and economic context as all aspects of city living are examined — from transport infrastructure to food production and supply, to demonstrate that sustainable development in an urban context should improve the quality of urban living.

ENERGY, TRANSPORT AND THE ENVIRONMENT

Transnet. 1990. £20.00.

This report estimates that road and rail transport in the UK use 50 per cent more energy than most statistics show, if vehicle manufacture and maintenance and the provision of transport infrastructure are taken into account. Between 1978 and 1988 energy consumption per passenger kilometre travelled decreased by 3 per cent. Passenger kilometres travelled increased by 31 per cent. This, coupled with project improvements in vehicle efficiency and transport growth, highlights the massive increase in energy consumption and CO_2 emissions that our current transport policies will afford. Thus concluding, as have many recent studies, that only a radical change in transport policies and attitudes to car usage can reduce the environmental impact of transport on the environment.

THE EARTHSCAN ACTION HANDBOOK FOR PEOPLE AND PLANET

Miles Litvinoff. Earthscan, 1990. £7.95. ISBN 1853830623.

Environmental problems are discussed in individual chapters covering major issues including food, health, women, deforestation and atmospheric pollution, each structured to define the problem, action that can be taken and how the individual can get involved.

QUIET REVOLUTIONS — POWERTRAIN AND VEHICLE NOISE REFINEMENT

Institution of Mechanical Engineers. 1990. £53.00. ISBN 0852987242.

Conference proceedings covering a range of road vehicle noise topics including legislation, acoustic modelling of exhaust noise and noise monitoring.

ACIDIFICATION IN FINLAND

Ed. P. Kauppi, P. Anttila, K. Kenttämies. Springer-Verlag, 1990. ISBN 3540522131.

The findings of the Finnish Acidification Research Programme, 1985-1990 are presented here in thorough study of acidic deposition in Finland, covering emissions, deposition and the state of, and effects of acidification on, terrestrial and aquatic ecosystems.

A TRADE UNIONISTS GUIDE TO ENVIRONMENTAL ISSUES

Labour Research Department, 1990. £1.20. ISBN 0946898766.

This booklet puts environmental issues in a trade union context. It looks at the conflict that is often found between union concerns and environmental issues, and highlights the areas in which trade unions have taken action to protect the environment and how they can become more environmentally friendly.

DIRTY WORDS — WRITINGS ON THE HISTORY AND CULTURE OF POLLUTION

Ed. H. Brady, Earthscan, 1990. £6.95. ISBN 1853830798.

Resulting from a symposium at Oxford, this is an entertaining and informative collection of essays by experts in various fields, who put our current concerns about environmental degradation in a literary and historical context.

MASTERING THE NEW ENVIRONMENTAL AGENDA

Environmental Policy Consultants. 1990. £45.00.

An analysis of the Government's Environment White Paper, which provides a comparative study of the differing environmental policies of the European Commission, Conservatives, Labour and Liberal Democrats. Presented in an easy to use tabular form, and with direct reference to the parties' policy documents, it provides a useful guide to the divided opinions on the implementation of policy goals.

ENVIRONMENTAL POLLUTION AND CONTROL

P. Aarne Vesilind, J.J. Peirce, R.F. Weiner. Butterworth-Heinemann, 1991. £26.00. ISBN 0409902721.

An established American text book designed to present the technical aspects of environmental engineering to a lay audience. It clearly sets out the problems of air, noise, water and waste pollution and looks at measurement and control in simplified terms.

ECOLOGY AND LAND MANAGEMENT IN AMAZONIA

M.J. Eden. Belhaven Press. £32.00. ISBN 1852931183.

An analysis of the ecology of the rain forest and its exploitation by a researcher of 25 years experience. It presents a detailed look at climate and ecology and at the history of, and present state of, human intervention in the rain forest. The author gives his view of how the forest can be preserved.

PROCESSING AND UTILIZATION OF HIGH-SULFUR COALS III

Ed. R. Markuszewski, T.D. Wheelock. Elsevier, 1990.

Proceedings of a biennial conference on current developments in the field of high-sulphur coal technology — including desulphurisation, chemical cleaning technologies and coal utilisation.

FUTURE EVENTS

19-21 APRIL — UKELA ANNUAL CONFERENCE

Plenary and simultaneous sessions covering environmental assessment, EPA duty of care, progress with citizens' suits, the environment white paper, setting up an environmental law practice, genetically modified organisms and LA air pollution controls. Fee £135 residential, £90 non-residential.

Venue: East Midlands Conference Centre, Nottingham.
Details: Dr. Christina B.T. Hill, Honeycroft House, Pangbourne Road,
Upper Basildon, Berkshire RG8 8LR.

23 APRIL — CONTAMINATED LAND

One day conference looking at the new liabilities for contamination to land by waste disposal included in the *Environmental Protection Act*, including costs of cleaning up, registers of contaminated land and anticipated EC legislation. Fee £300 plus VAT.

Venue: Royal Garden Hotel, Kensington High Street, London W8.
Details: L & B Forum, 14 Bowden Street, London SE11 4DS.
Tel: 071 793 1230 Fax: 071 793 1250.

13-14 MAY — DUTY OF CARE: IMPACT ON MANUFACTURERS

The conference will examine the requirements of the EPA whereby those creating wastes, particularly of a hazardous nature will need to exercise the duty of care for the management and disposal of waste. Fee £465 plus VAT.

Venue: Marriott Hotel, London W1.
Details: Katie Lye, IBC Technical Services Limited.
Tel: 071 236 4080 Fax: 071 489 0849.

16 MAY — CHP: CREATING HIGHER PROFITS

Institute of Energy Annual Conference and Exhibition.

Venue: The Mount Royal Hotel, Marble Arch, London W1.
Details: Judith Higgins, IoE. Tel: 071 580 0008 Fax: 071 580 4420.

21 MAY — NEW TECHNOLOGIES FOR AIR POLLUTION CONTROL AND REDUCTION

One day symposium organised by the Royal Society of Chemistry in collaboration with the Combustion Institute and the Institute of Energy. The meeting will concentrate on new and improved systems for reduction of pollution from combustion sources. Fee £75 (members £50).

Venue: The Scientific Societies Lecture Theatre, New Burlington Place, London W1.
Details: Pauline Sim, Gascoigne Secretarial Services.
Tel: 0494 713664 Fax: 0494 714516

23 MAY — LAND FILLING WASTE: HAZARD ASSESSMENT AND CONTROL

One day seminar looking at the latest information on hazard assessment models and the development of landfilling practices.
Venue: Portman Hotel, London W1.
Details: Katie Lye, IBC Technical Services Limited.
Tel: 071 236 4080 Fax: 071 489 0849.

9-13 SEPTEMBER — CLEAN AIR AT WORK

Symposium focussing on methods of measuring air quality in support of the European Community's Exposure Limits Directive and related work on standards and quality assurance. Jointly arranged by European Commission, Royal Society of Chemistry and HSE.
Venue: Luxembourg.
Details: HSE. Tel: 071 243 6000 Fax: 071 727 6268.

24 SEPTEMBER — EUROPEAN WASTE POLICY: MAKING IT WORK

Second annual conference of National Association of Waste Disposal Contractors will address the major aims of the European Commission's waste management strategy and how it will be implemented in practice in the UK.
Venue: Queen Elizabeth II Conference Centre, London.
Details: Claire Foxley. Tel: 081 602 8115.

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VOL. 21 NO. 2
SUMMER 1991

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NATIONAL SOCIETY FOR CLEAN AIR AND ENVIRONMENTAL PROTECTION

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EDITORIAL

ANYONE FOR AUDITS?

We are entering the age of the environmental audit. The European Commission is proposing wide-ranging audits of industrial activities which affect the environment, whilst several local authorities are producing "green" audits of the environment under their jurisdiction. Instinctively one assumes that the results will be beneficial, but what are such audits aiming to achieve?

Under the EC proposals 58 different categories of industry would be required to undertake extensive assessments of "emissions to air, land and water, legal constraints, the effects on the neighbouring community, landscape and ecology, and the public's perception of the company's operations." Companies would have to prepare evaluations of alternative methods of reducing pollution, minimising resource use, and so on. All this paperwork would then be subject firstly to external verification by "registered environmental auditors" and secondly to public scrutiny via an annual environmental statement.

There are a number of inherent problems. Designing an audit method which would be sufficiently all-encompassing without being impossibly time-consuming will be difficult. Questions of commercial confidentiality will be raised repeatedly. How will the qualification criteria for external auditors be set? And if audited activities are deemed to be unsatisfactory, what powers will be sought to force companies to change? This could be the recipe for a bureaucratic nightmare which ultimately would achieve very little.

What is the primary intention of audits? All we really need to know is whether industries are using Best Available Technology Not Entailing Excessive Cost in pursuit of the Best Practicable Environmental Option, and to make such information available to the public. In the UK we already have a relevant framework in the *Environmental Protection Act.* In the US the publication of annual toxic release inventories for companies serve a similar function. It would be hard to justify further interference in industrial affairs, let alone agree a suitable mechanism. Our regulators set legitimate environmental targets — how those targets are attained must remain a matter of judgement for industry.

Meanwhile, a green audit of Lancashire has landed on the *Clean Air* editorial desk with a particularly heavy thump. Running to over 300 pages, it is a state of the environment report prepared by Lancashire County Council who describes it as "the most comprehensive analysis of the environment of an area yet produced in this country." It is certainly an extraordinarily detailed document which makes for interesting reading, but one is immediately conscious of the tremendous amount of time and resources which must have been involved in its production.

Several local authorities have commissioned or produced green audits. Once again, we should define their purpose. They must be distinguished from "green charters" which represent statements of local authority environmental policy. Most usefully, green audits provide a baseline of environmental data and information against which future developments can be measured. They also create a focus for public consultation and involvement. However publishing a green audit is not in itself evidence of environmentally-friendly activity; the considerable resource input must be justified by measurable results. Audits serve as a basis, not a substitute, for action.

ENVIRONMENTAL PROTECTION 1991

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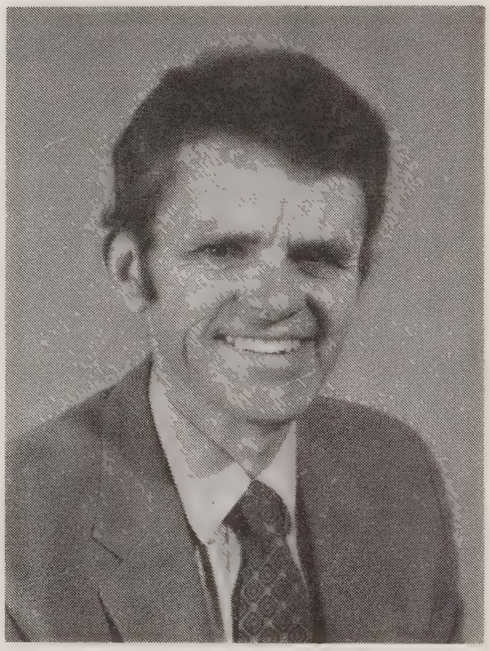
NSCA NEWS AND VIEWS

NSCA SECRETARY GENERAL



Dr. Robert (Tom) Crossett has been appointed by the Council to succeed Air Commodore John Langston who is retiring, as Secretary General of the NSCA. The date on which he will take up his appointment has still to be finalised.

Tom Crossett, who is currently Environment Director of National Power, which he joined in 1989, said he was delighted to be coming to the Society at an exciting time in the development of UK environmental protection. He said that the introduction of integrated pollution control, pressing for effective action on the commitments towards the environment made by all political parties, new obligations to disclose environmental data and the impact of legislative measures coming from the EEC would offer opportunities and challenges to the Society. He said "I am very conscious that the strength of the Society lies in the unique breadth and extent of experience in the Council, its Committees and the membership. I hope that my previous experience in science, government and industry will be of use in helping the NSCA to focus that strength on the opportunities and challenges which lie ahead."

Tom Crossett graduated in 1961 from Queens University Belfast with First Class Honours in both botany and agriculture. He then carried out research in plant physiology, biophysics and marine ecology based at the Universities of East Anglia and Oxford. He was Head of the Environmental Studies Group of the Australian Atomic Energy Commission for three years before joining the Agricultural Research Council Letcombe Laboratory to investigate the effects of soil atmosphere on plant root growth.

In 1972, Tom Crossett moved to Edinburgh where for 12 years, he planned and commissioned agricultural and horticultural research, initially for the Scottish Office and later for the Ministry of Agriculture, Fisheries and Food (MAFF) in London. He became head of MAFF's Food Science Division in 1984 and Chief Scientist for Fisheries and Food in 1985.

Tom Crossett, who is married with two grown up sons, has lived in Lewes, East Sussex for 13 years. His interests include orienteering, hill walking, gardening and small boats.

BEYOND THE GREEN BILL

Despite the seemingly endless number of conferences all taking the *Environmental Protection Act* as their theme, NSCA's annual workshop held in Oxford (9-11 April) still managed to attract a capacity attendance. Lord Nathan (former President) and Bill Snow (former Chairman) chaired the workshop sessions.

The first sessions looked at progress in implementing the new Act — it was suggested that the fact that the Government had published a timetable covering implementation of Part I was cause to have greater expectations from the Act than from the *Control of Pollution Act 1974.* Much of that had remained to be brought into force 16 years after enactment. This optimism did not extend to Part II of the Act which portends major changes to waste management in the UK — no timetable has been published and a number of detailed issues remain to be clarified, not the least of which is the exact extent of the duty of care.

For industry, the CBI generally welcomed the new legislation which if properly and consistently enforced would offer a system of control which concentrated on preventing pollution at source. However, there were still doubts as to how the principle of BATNEEC could be implemented fairly — "available technology" was difficult to define and "excessive costs" was a term which meant different things to different people.

Local authorities have long argued that they are well placed to provide effective local pollution control; however, the IEHO speaker reminded delegates that the question of resources will affect the ability of the local authorities to respond to their new powers. Over the past few years the responsibilities of EHOs have grown to include duties under the *Water Act, Local Government and Housing Act,* the new *Food and Safety Act* and now the EPA. The need to retrain and reorganise to take on board major and fundamental changes to the work practices of EHOs, coupled with the financial restraints most LAs were under, could seriously affect the effective implementation of the EPA.

Costs and charges of a different sort were addressed by two other speakers. John Barton (WSL) presented a detailed cost assessment (see this issue of *Clean Air*) of the Government's White Paper commitment to recycle a quarter of household waste by the year 2000. His calculations balance cost savings through reductions in the weight of rubbish for disposal and the value of recovered material against the extra cost of collecting and separating waste. He calculated that a tonne of rubbish is worth just over £30, with aluminium cans, paper and glass the most valuable components. However the costs of recycling are around £55 per tonne. As a result the Government's 25% recycling target would cost each household an additional £9.60 yearly. This might be acceptable to the public if it is shown that "the waste service already costs £38.50 and for £48.10 they can have a recycling service as well", he said. "An additional cash cost input of perhaps £200 million per year is needed. . .costs are likely to inhibit widespread adoption of high recovery schemes if local authorities are expected to shoulder the full burden alone".

Taxing pollution is an area attracting considerable debate both in Europe and the

UK. Dr. Dieter Helm (New College, Oxford) in his presentation (see this issue of *Clean Air*) argued for the replacement of regulation by market based control mechanisms, suggesting that the tax system, rather than consents and courts, was the appropriate mechanism for making polluters pay.

As is usual with NSCA workshops, the contribution from delegates was an important element, generating a high level of discussion and debate. Copies of papers presented at the workshop will be available from NSCA within the next few months, price £2.50 per paper.

NORTH WEST DIVISION

Nearly 100 delegates attended the Division's spring symposium held on 19 March at Prescot in Lancashire. The objective was to provide a general briefing on the *Environmental Protection Act 1990,* an update on the legislative programme in general and to deal with incineration processes specifically. In drawing up the programme it had been felt that both NSCA members and non-members would welcome more information on incineration processes and associated pollution problems: the issues affecting the majority of local authorities with hospital waste incinerators appear to revolve around the future requirements of pollution control and how these could be effected in the Health Authority.

The opening speaker was NSCA's Secretary General, John Langston; he emphasised the importance of the European dimension, drawing attention to the links between EC legislative requirements and pollution control profiles to those recently enacted in Britain, and the proposed new regulations.

Penny Brooke (DoE) gave an overview of the guidance documents and timescales for BATNEEC processes. She suggested that it was important to put legislation in perspective by introducing management philosophy to project monitoring. The salient points being to achieve the programme set out for "block" applications and to ensure that applicants are kept advised of the requirements in an endeavour to speed up the authorisation process. Andy Harrison (HMIP) agreed and in his presentation dealt with the information needs and requirements of the Inspectorate in assessment of processes and emission control. This formed a useful parallel to the local authority control mechanisms contained in the regulations and process guidance notes.

Monitoring emissions and recording of information were areas which it was felt needed elaboration and detailed attention. The process guidance notes are directed towards setting up appropriate monitoring systems using techniques applicable to the pollutant. Chris Caneter (Rendel Science and Environment) gave a most helpful presentation on the sampling techniques available. This is a topic that is to be extended by the Division as it is clear from the questions raised that more training is required.

Speakers during the afternoon concentrated on the practical aspects of incineration. David Knight (Cleanaway Ltd), George Davies (NIFES), Clive de Grey (S. Grundon (Waste) Ltd) and Clive Chamberlain (Evans Universal Ltd) presented papers on chemical waste, municipal waste, clinical waste incinerators and crematoria.

In summing up the symposium the Division's Chairman, Dr. John Allan, said "we must face the reality that incineration is here to stay; more information is required of incineration processes and associated pollution problems and today we have provided answers to many of the questions raised on this important issue." He added that NSCA would always take an active interest in bringing pollution matters into the wider arena and expressed his thanks to all the speakers.

SCOTTISH DIVISION

NSCA's Scottish Division has obtained a three-year grant from the Scottish Office to employ a part-time Administrative Officer. Clare Carruthers starts work in June and will be based in Glasgow. The grant — which will be matched by funding from NSCA — is to allow the Division to expand membership, provide an information service, promote Society publications and organise seminars and workshops.

NSCA INFORMATION SERVICES

For the third year in succession requests for information have increased. In 1990, 5,500 (1989: 4790) requests were received of which 3,350 were from children and 2,150 from adults. Most of the requests from children are in connection with GCSE projects, although it would seem that concern for the environment begins in junior school.

Already these figures look set to be exceeded in 1991: during the first three months of the year 2,000 requests have been received of which 1,018 were from adults and 982 from children. In addition the Information Department also deals with some 60 telephone calls a week from the general public and from the Press.

LONDON, SOUTH EAST AND CENTRAL SOUTHERN DIVISIONS OF NSCA

ADVANCE NOTICE

THE ENVIRONMENTAL IMPACT OF TRANSPORT IN THE SOUTH EAST (LOOKING AHEAD OVER THE NEXT TEN YEARS)

One-day seminar to be held on
Tuesday, 26 November 1991 at the
Kennedy Lecture Theatre, Institute of
Child Health, 30 Guildford Street,
London WC1 1EH.

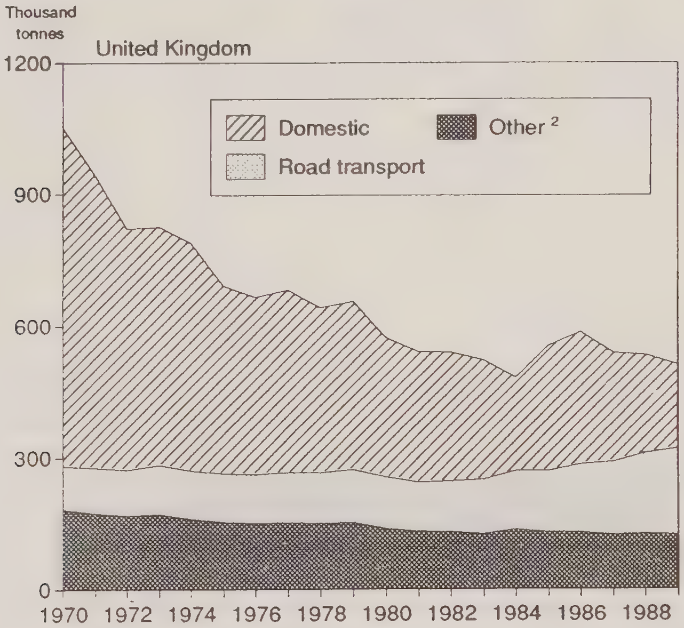
Full details will be available late summer
from Mr. J.J. Beagle, Hon. Secretary,
19 Oxgate Gardens, Brent, London NW2 6EA.

SMOKE IN THE STREETS
THE RISING IMPACT OF DIRTY DIESELS

Less Smoke, But More From Diesels

The latest annual Department of Environment statistical digest(1) shows a reassuring picture of falling smoke emissions (below). However the nature of British smoke is changing.

Black Smoke: Estimated Emissions



1. Based mainly on constant emission factors.
2. Commercial / public service; power stations; refineries; agriculture; other industry; railways; civil aircraft; shipping.

source: Warren Spring Laboratory

The DOE figures show that the fall in smoke emissions is largely attributable to a decrease in the burning of domestic coal. At the same time emissions from road transport are gradually rising. Some kinds of smoke are dirtier than others, depending on the amount of elemental carbon, or carbon black, which the smoke contains. Diesel smoke is by far the dirtiest; comparison of the soiling effect of different types of smoke show that diesel is three times more soiling than coal smoke. A range of soiling factors is shown below.

At 198,000 tonnes pa, black smoke from road transport has now overtaken domestic coalburning as the major source of emissions. The overall soiling effect of traffic is a combination of smoke from petrol engines (which is relatively less soiling than coal smoke) and diesel smoke, which is three times dirtier than coal smoke.

Research in the US(3) shows that some vehicles emit a thousand times more carbon black in their exhaust fumes than others, and that "average" diesel vehicles are around a hundred times smokier than "average" petrol vehicles. In the UK three times as much petrol is burned as derv, but the inherent smokiness of diesel engines ensures that diesel combustion produces 182,000 tonnes of black smoke a year, whilst total emissions from petrol are only 15,000 tonnes (1). Because much of the diesel smoke is produced at ground level in urban streets it has a very direct impact on people and buildings.

Soiling Propensity of Smoke from Combustion(2)

Source and fuel type		Soiling factor relative to coal
Domestic:	coal smokeless fuel	1 1
Vehicles:	petrol diesel (derv)	0.43 3
Commerce/industry:	coal gas oil fuel oil	1 1.55 0.43

2. Will The Picture Continue To Darken?

NSCA analysis of DOE statistics (1) for the last decade shows that road transport is the only sector where emissions of *all* the major air pollutants are still increasing (civil aviation is also increasing emissions of some pollutants although it remains a comparatively small net contributor to overall pollution levels). Other sectors such as power stations, industry and domestic, are now generally less polluting than they were ten years ago.

The table indicates a 64% rise in emissions of black smoke from road transport over the past decade. Analysis of black smoke emissions by type of fuel shows a 67% increase in emissions from derv over this period. The inexorable rise in road traffic virtually guarantees that for the next few years at least, smoke levels will continue to rise alongside other road traffic pollutants.

A report(4) by NSCA in 1988 drew attention to the widespread problems caused by diesel smoke, and to the inadequacy of current controls on smoking diesels. Since then, the Government has gradually acknowledged the extent of the problem. Speaking in January 1991, Transport Minister Christopher Chope MP said:

> "Large diesels are also the predominant source of particulates in our cities. Diesel particulates are mostly pure carbon with oily coating. They are a major cause of soiling on buildings. There is growing evidence that they are not good for human health. . ."(5)

To its credit, the Government has supported the introduction of stricter EEC standards for new heavy duty diesel vehicles. These were agreed in March 1991 and standards for new European diesels should match those of the US by 1996. But once a new vehicle is in service, its engine can deteriorate or lose its "tune" quickly. The second line of defence against diesel smoke is thus the annual MOT test which includes a visual check of smoke from exhaust. Again, to the Government's credit, the 1990 environment White Paper(6) admitted the problem of diesel particulate emissions and promised to review methods of testing emissions from heavy diesels.

Pollution From Road Transport 1979-89

Pollutant	1979 thousand tonnes	1989 thousand tonnes	% of current UK total emission	79-89 10-year % rise	other sectors 10-year % rise
Black Smoke	121	198	39	64	none
Sulphur Dioxide	55	60	2	9	none
Nitrogen Oxides	908	1298	48	43	civil aircraft 45
Volatile Organic Compounds	490	762	37	56	processes & solvents 3, gas leakage 10, civil aircraft 33
Carbon Monoxide	3992	5751	88	44	civil aircarft 57
Carbon Dioxide	21000	29000	19	38	none

All the evidence suggests however that an annual test alone will be insufficient to deter smoky vehicles. Department of Transport figures(7) show that the percentage of vehicles failing the MOT on a visual assessment of smoke is much lower than the percentage detected in random roadside tests by the vehicle inspectorate. Research in California(8), where exhaust emissions are already part of the MOT-equivalent test, shows no correlation between the pollution caused by a vehicle and the amount of time which had lapsed since testing. In other words, despite annual testing, engines can quickly lose tune and become polluting. Paradoxically, this may be true even more so of new diesel engine designs where sophisticated refinements designed to optimise pollution control may deteriorate more rapidly once the optimisation is lost(9). The third line of defence against diesel smoke must therefore be a system for spotting smoking vehicles whilst in use on the road and requiring them to rectify the problem.

3. Who Spots Dirty Diesels?

It is this third line of defence where Government policy remains hesitant. In July 1990 NSCA circulated a discussion paper(10) to a number of organisations with responsibility for motor vehicle pollution control. The paper noted that, whilst emission standards for new vehicles are improving, there is inadequate control of pollution, smoke and noise from in-use vehicles. At present this is a grey area falling between the police, environmental health officers (EHOs) and the Department of Transport Vehicle Inspectorate (VI). NSCA cited an Australian system where both EHOs and police officers were involved in "spotting" defective vehicles and requiring them to be checked at official testing stations.

For smoky vehicles in the UK — predominantly heavy diesels — the police will only prosecute if the amount of smoke produced is a road safety hazard. In letters to NSCA, both the Home Office and Association of Chief Police Officers have said that the control of general smoke pollution from road vehicles should be the remit of environmental health departments. However local authorities have no powers to control emissions from road vehicles. There is no consensus that local authority EHOs should be involved in this sort of work, although there is a clear link both to trading standards and pollution control activities. An alternative would be to make the system the responsibility of the police or DTp vehicle inspectors, but these bodies might not be able to prioritise such work and may be less responsive to local demands.

In many other countries, police and local environmental control agencies cooperate in spotting defective vehicles. Detection of defective vehicles "in the field" could be based on a simple visual assessment, for instance the Australian criterion is an observed emission of visible smoke for ten seconds or more.

There are precedents for cooperation between police forces and environmental health departments in the UK. Experiments involving the Derbyshire constabulary and local EHOs in measuring motorcycle noise have proved very effective, whilst trading standards officers already work with police in checking axle weights on HGVs. However, in letters to NSCA neither the Association of Chief Police Officers nor the Institution of Environmental Health Officers advocate any expansion of their role in this area.

In a recent letter (11) to Joan Walley MP, Transport Minister Christopher Chope appeared to rule out any role for local authorities in checking for smoky vehicles. He wrote:

> ". . .on roadside checks, there will certainly be a role for police and the Vehicle Inspectorate. We will need to see how things develop but, at this stage, it seems unlikely that local authorities will become involved to the same extent, since the police and VI have the major responsibility for enforcing the law on vehicle construction and use."

It seems therefore that DTp policy on controlling smoking diesels rests on the threat of detection by the VI at their occasional roadside spot-checks. This is hardly a major incentive to vehicle operators to clean up their act. NSCA believes that new powers should be given to the VI, police and/or EHOs to enable them to undertake a simple visual assessment of smoking vehicles in use on the road and issue a legal requirement to the vehicle owner to have the vehicle checked at an MOT testing station.

4. The Public On Patrol?

In the absence of decisive action from the DTp, NSCA has collaborated with two pilot schemes run by local authorities in Derby and Kirklees(12). These rely on members of the public spotting smoky vehicles and reporting them to special smoke hotlines. Since the local authority has no legal authority to take action, they issue advisory letters to owners of vehicles which are reported. The DTp has promised to cooperate with these schemes, and results should be available in the autumn. The advantage of such schemes is that local authorities are able to mobilise public opinion and raise the awareness of vehicle operators, without having to resort to legal action.

The Department of the Environment, meanwhile, has taken an upbeat approach to spotting dirty diesels. In March 1991 it launched the distribution of five million leaflets entitled "Wake up to What You Can Do For the Environment". The leaflet advises the public that they can make a contribution to environmental protection by reporting the registration numbers of unacceptably smoky vehicles thus:

> "TELL your regional traffic area office (for the number see the telephone directory) of the registration numbers of unacceptably smoky vehicles."(13)

Sadly the leaflet fails to report that regional traffic area offices are listed under "Department of Transport" in directories, but the intention is clear. Calls to NSCA from members of the public who had tried, and failed, to report smoky vehicles, prompted us to survey the response of traffic area offices to complaints by telephone.

5. NSCA's Phone Survey

The survey was undertaken by NSCA staff on 22 April 1991. There are nine regional traffic area offices in the UK. The first hurdle we encountered was locating the correct office. The DOE leaflet does not explain that traffic area offices are listed under "Transport, Department of," in the telephone directory or give any indication of the office within that body likely to have responsibility for smoky vehicles. We found that the general switchboards of three offices had no knowledge of any such scheme, two referring the caller to the vehicle licensing centre at Swansea and one to the Health and Safety Executive! In six cases at least two calls had to be made before the correct office was located.

The office dealing with complaints was found to be either the Traffic Area Headquarters, Traffic Examiners Office, Traffic Enforcement Office or Vehicle Examiners Office — all of which has proved very confusing for concerned members of the public. Of the offices contacted, only four would respond immediately following a phone call, one referred complainants to district HGV testing stations.

Only three of the offices gave an immediate and positive response to the caller wishing to report a smoky vehicle. Most offices were vague about their responses to complaints; in only three cases could the department give specific details of follow up action — letters are issued to the operator requiring rectification of vehicles. It was difficult to ascertain details about numbers of complaints — only two of the offices received them in any quantity. These were the accessible and helpful ones.

From NSCA's research it emerges that it is not easy for members of the public to follow Department of the Environment advice on protecting their environment. Only three offices were contacted directly from the area office number in the telephone directory. In two cases a number of calls to a range of departments proved fruitless. In most instances, the apparent inadequacy of response to complaints and the complexity of actually lodging a complaint is likely to deter people from reporting vehicles. There appeared to be no coherent policy between offices for dealing with complaints, and indeed some offices are unaware of their responsibility for dealing with them.

However on 23 April, Transport Minister Christopher Chope MP outlined for the first time his Department's policy on dealing with complaints from the public. In response to a parliamentary question from Joan Walley MP he said:

> "If a complaint is about a smoky vehicle subject to operator licensing (which means most buses and lorries) and sufficient details of the vehicle and the incident are provided, the Department will write to the operator. The letter will ask him to have the vehicle checked and to report to the Department, within 10 days of the date of the letter, on the action taken. The letter will also warn that excessive smoke emission is an offence under regulation 61 of the *Construction and Use regulations.* As these arrangements have only recently come into force, it is too soon to estimate their impact on numbers of complaints".

This is a welcome statement of DTp policy; publishing a list of contact telephone numbers for its area offices would be a helpful next step. NSCA's advice to anyone concerned about diesel smoke is now simple — get phoning! However written advice "to have the vehicle checked" does not imply a requirement to have it tested at an MOT station. Nor does the Minister state what action will be taken if an unsatisfactory response is received. The case for a second tier of control backed by new legal powers remains unanswerable.

6. Conclusions

The latest official statistics(1) show that road transport is now the major source of smoke pollution in the UK and the figure looks set to rise, thanks largely to smoke from diesel vehicles.

Despite improvements in standards for new vehicles, there is no effective system for apprehending smoking vehicles once on the road. Without such a system, diesel smoke will continue to plague our city streets.

The Department of the Environment now encourages the public to report smoking vehicles to Department of Transport Area Offices, but our survey reveals the DTp response to be uncertain and confused.

The DTp has stated that it will follow up public complaints with an advisory letter, and NSCA encourages the public to start reporting smoking vehicles to area traffic offices. However this does not detract from the need for a professional role in spotting smoking vehicles and requiring them to be checked at an MOT station.

7. Recommendations

(i) The DTp should publish and publicise the telephone numbers of area office departments dealing with complaints about smoking vehicles.

(ii) The DTp should clarify its policy in responding to such complaints from the public.

(iii) Local authorities should be encouraged to experiment with public participation exercises in smoke-spotting which result in advisory action against operators of allegedly smoking vehicles.

(iv) New powers should be given to the VI, police and/or EHOs to enable them to undertake a simple visual assessment of smoking vehicles in use on the road and issue a legal requirement to the vehicle owner to have the vehicle checked at an MOT testing station.

8. References

1. Digest of Environmental Protection and Water Statistics, No. 13, 1990; HMSO (1991).
2. Particulate carbon emissions and diesel vehicles; D J Ball, IMechE C337/87 (1987).
3. Individual measurements of the emission factor of aerosol black carbon in automobile plumes; A D A Hansen & H Rosen, J. Air Waste Manage. Assoc. 40: 1654-1657 (1990).
4. Dirty Diesels; NSCA Campaign Report, NSCA (1988).
5. Parliamentary Debates House of Commons Official Report; European Standing Committee A, 30.1.91 HMSO (1991).
6. This Common Inheritance; HMSO (1990).
7. Given in answer to Mrs Ann Taylor MP 19.2.90 (1990).
8. Emissions from in-use motor vehicles in Los Angeles; D R Lawson et al, J. Air Waste Manage. Assoc. 40: 1096-1105 (1990).
9. The future for diesel engine emissions and legislative control for the 1990s; M Fox, NSCA 57th Conference Proceedings, NSCA (1990).
10. Controlling nuisance from road vehicles, NSCA (1990).
11. 15.3.91.
12. Smoke emissions from vehicles; P Kanuritch, Environmental Health 99: 84-86 (1991).
13. Wake up to what you can do for the environment; Department of the Environment (1991).

Postscript

NSCA's pressure has resulted in the Department of Transport publishing a list of telephone numbers for the public to report smoky vehicles. They are

Birmingham	021 631 3300
Bristol	0272 297221
Cambridge	0223 358922
Cardiff	0222 394027
Eastbourne (covers London!)	0323 21471
Edinburgh	031 225 5494
Leeds	0532 499433
Manchester	061 872 5077

Kirklees MBC launched its "Kirklees Smoky Vehicles Programme" during National Environment Week (11-19 May). From 15 May, people were able to report excessive smoke emission by making a note of the vehicle's registration number, the date, time and location and to pass the information, along with their own name and address, to a central 'phone number. The Driver and Vehicle Licensing Agency has agreed to support the scheme by supplying the name and address of the registered owner. Details will be kept under strict security and used only for the Smoky Vehicles Programme.

Although Kirklees will have no powers to prosecute owners of private cars, owners of offending vehicles will receive a letter, explaining the problems of smoke emissions and pollution, and a factsheet about possible causes of excessive smoke. They will also be invited to contact Kirklees Environmental Health for more details. Reports concerning public transport or goods vehicles, however, will be passed on to the local Vehicle Inspectorate.

As well as many other environmental improvement initiatives, Kirklees will be monitoring levels of benzene, a possible cause of cancer, and nitrogen oxides, which cause respiratory problems.

Kirklees' scheme is based on a successful Australian public awareness programme (Clean Air, Vol. 20, Summer 1990) and has been welcomed by the National Society for Clean Air and Environmental protection (NSCA).

AIR QUALITY BULLETINS

As reported in the Winter 1990 edition of *Clean Air,* the Government has honoured its pledge — given in the environment White Paper — to include air pollution information in weather bulletins issued by the Met Office. Under the scheme air quality is designated as either very good/good/poor/very poor, according to the presence of three indicator pollutants — sulphur dioxide and nitrogen dioxide in winter and ozone in summer.

The Department of Health has now issued its guidelines on air pollution — more specifically what "sensitive" individuals can do during periods of high ozone concentrations. During periods of "poor" air quality those affected are warned to avoid vigorous exercise and to stay indoors, and to avoid unnecessary exercise altogether during "very poor" episodes.

Although NSCA has a quibble about the terminology used (the "good" banding allows up to 100 ppb of ozone, whilst the World Health Organisation recommends a one hour guideline of 76-100 ppb for ozone), we are keen to see the media carry reports of air quality routinely — both in the interests of those whose health may be affected, and as an exercise in increasing the public awareness of environmental quality.

During the ozone episodes of last summer many journalists and news editors called for easier access to information about air pollution levels. The DOE now makes its monitoring data available daily, but whilst occasional peaks of pollution may be of interest, no papers will carry routine air quality information alongside routine weather reports. NSCA has written to all editors of national newspapers but the attitude seems to be "good news is no news". In cities such as London, Cardiff, Sheffield and Bristol however, local media do carry air quality reports based on local pollution monitoring. Details of the Bristol and Sheffield schemes follow this report.

NSCA is continuing its efforts to encourage the national media to carry regular reports on air quality. The information is also available via telephone on the air quality information call 0839 500733. The air quality health advice line is 0898 400180.

BRISTOL

Letter to the Editor,
from Senior Scientific Officer, Bristol City Council

Further to your report (*Clean Air,* Vol.20, No. 4) on the Department of the Environment's Air Quality Bulletins and air quality categories I would like to inform you of Bristol's response to this issue.

Following the DOE's press release the Bristol Weather Centre, having established that none of the WSL sites were in the Bristol area, approached this Department to investigate the possibility of similar, local, information being provided for incorporation in the weather forecasts.

Bristol Environmental Health Department operates two continuous monitoring sites, one for oxides of nitrogen, sulphur dioxide and ozone at Blaise Castle House on the northern outskirts of the City and the other, a roadside site for oxides of nitrogen and carbon monoxide at Old Market in the centre of the City. At this time (November 1990) telemetry links were in the process of being established to the two sites and agreement was reached that information would be provided when these links were fully operational.

The DOE categories were studied and, in common with many other bodies, the view was taken that whilst they were welcome they were flawed.

In consequence a set of local guidelines (see below) were drawn up, a necessary step in any case as the DOE had no guidelines for carbon monoxide, based on WHO guidelines. The approach adopted was to add a fifth category, moderate, between good and poor, and to tighten up the concentration ranges for the categories. It was also felt that an approach based solely on hourly mean values was not ideal and so guidelines for 8 hourly and daily values were also produced.

Trials were carried out on the provision of information in December 1990 and the regular service commenced on 7 January 1991. Currently information is provided on every weekday and appears on BBC "Points West" in the weather forecast. To date concentration of both nitrogen dioxide and carbon monoxide at Old Market have on a number of occasions been in the "poor" range and have sometimes approached the "very poor" category.

There is a facility for the provision of information at weekends, although this has not yet been used, with a laptop computer being linked to the monitoring sites by a modem from an Officer's home. It is envisaged that this procedure might be used in summer if there were a repeat of the ozone incidents of 1990.

Suggested Air Quality Criteria For Bristol (Hourly Means)

Category	NO_2	SO_2	O_3	CO
Very Good	<50	<60	<50	< 5
Good	51-100	61-125	51-75	5-10
Moderate	101-150	126-300	76-100	11-20
Poor	151-250	301-500	101-160	21-25
Very Poor	>250	>500	>160	>25

Suggested Air Quality Criteria For Bristol (8-Hourly Means)

Category	NO_2	SO_2	O_3	CO
Very Good	<30	<45	<35	< 4
Good	30-50	45-90	36-50	4-6
Moderate	51-75	91-150	51-60	7-10
Poor	76-100	151-250	61-100	11-15
Very Poor	>100	>250	>100	>15

Suggested Air Quality Criteria For Bristol (Daily Means)

Category	NO_2	SO_2	O_3	CO
Very Good	<25	<40	<30	< 3
Good	25-40	40-80	30-40	3-5
Moderate	41-60	81-135	41-50	5-8
Poor	61-85	136-250	51-60	8-12
Very Poor	>85	>250	>60	>12

All values in parts per billion (ppb) except carbon monoxide which is in parts per million (ppm).

SHEFFIELD

AIR ALERT came into existence in Sheffield on 13 May. The scheme measures three key air pollutants and produces an "air pollution index" for the public — basically a simple score for the quality of the air we breathe.

The AIR ALERT index uses the concentrations of three air pollutants — ozone, nitrogen dioxide and sulphur dioxide. The World Health Organisation has determined a threshold for each pollutant above which effects on health occur. AIR ALERT uses these threshold levels to produce a grade for each pollutant. In each case, the grade "poor" indicates that the pollutant level is around the WHO threshold.

The grades for each pollutant are then combined to produce an overall description of the air. If any single pollutant is graded poor, the overall description is "poor" and effects on health are possible. The description "fair" is used if the levels of two or more pollutants are raised but not enough to affect health. (A description "very poor" is available but is unlikely to be required in Sheffield.)

Radio Sheffield and Calendar South will carry AIR ALERT reports. Messages will go out several times a day. For example, when the index is poor, the message will show how the harm of pollution can be reduced, e.g. checking that necessary medicine is to hand; or changing plans for exercise.

The scheme is the result of collaboration between Public Health Doctors at Sheffield Health Authority, and Health and Consumer Services Officers in Sheffield City Council.

	WHO	Sheffield			
Pollutant	Threshold	Good	Fair	Poor	Very Poor
Ozone	150	< 60	61-120	121-200	>200
Nitrogen Dioxide	400	<100	101-250	251-400	>400
Sulphur Dioxide	350	<100	101-250	251-350	>350

(Hourly averages in microgrammes per cubic metre of air)

REPORTS

RECYCLING — CAN LOCAL AUTHORITIES MAKE IT PAY?

John Barton
Head, Materials Recovery Division
Warren Spring Laboratory

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INTRODUCTION

The *Environmental Protection Act* (1990) (EPA) places a duty on collection authorities to submit recycling plans for their areas. This is viewed as a key step in the drive to achieve the Government's target of 50% recovery of the recyclable content of domestic refuse by the year 2000 (a value equivalent to a 25% weight reduction in household refuse). The main practical manifestation of a recycling plan would be the development of an infrastructure to collect materials which industry can reprocess and include in feedstocks to produce new products. Whilst a collection system does not, of itself, guarantee a market for the recovered materials, it can engender confidence in industry that appropriate feedstocks are/will become available. This is seen as a necessary precursor to the investment needed in reprocessing capacity to use recyclables effectively.

The demand side in 'sentiment terms' is present; the public/consumer is pressing for alternatives to landfilling wastes, has demonstrated a willingness to actively participate in collection schemes and a willingness to buy products containing recycled materials. Industry recognises this demand, as witnessed by their eagerness to exploit 'recycled content' as part of their marketing strategy for products at every opportunity. The scope for misinformation in environmentally targetted marketing is also recognised and Government backed national/international schemes which hopefully will regularise the basis for manufacturers' claims are in place or under development.

However it is one thing to have the desire to see an objective reached and quite another to obtain agreement on what is an acceptable cost and who should pay it. The notion that to recycle materials may actually cost the householder via the local authority more than current disposal methods has not been fully taken on board by the general public. It has been convenient to concentrate on barriers to achieving higher recycling rates in terms of what practical changes are required as opposed to what they cost. This is natural and understandable: the true costs of current disposal options have been shrouded in mystery, many disposal options are not carried out to acceptable standards, few recycling schemes have been operating long enough or at sufficient scale to provide hard economic data and many industrial sectors have little real experience on which to allocate a cash value for the type of materials recovered from the householder.

Industry knows its costs and margins when converting existing raw material/scrap inputs to commodities of given specification and value; it has much less experience of the costs of upgrading/refining household 'concentrates' or the demand and likely selling price of materials containing high recycled contents which may not meet existing traditional quality standards for bulk commodities.

However one must start somewhere and recent measures/activities are beginning to reduce uncertainties. The EPA includes measures to separate regulatory activities from operations in the disposal of municipal waste by the creation of Local Authority Waste Disposal Companies (LAWDCs) and, though not in place, internal reorganisation has begun and disposal costs are becoming more obvious. The 'recycling credit' heralded by the Act is one instrument to ensure cost benefits of avoided disposal are properly assessed and made available to support recycling.

Industry has become more positive in terms of providing market guarantees for particular recyclables following detailed study of their operations to identify processes suited to accepting these materials, products able to use recycled inputs, specifications based on fitness for purpose and the investment necessary to expand production capacity.

A number of pilot/demonstration household collection schemes have now been running for up to two years in the UK and first hand cost data are becoming available from these and from schemes abroad. Steady progress has continued with the provision of 'drop off' or 'bring' collection schemes such as bottle banks and paper igloos.

Thus the question posed by the title of this paper "Can local authorities make recycling pay?" has become easier to answer; though still somewhat misleading in the sense that whilst a cash cost/benefit can now start to be calculated, it doesn't alter the underlying basis for a service; i.e. even if it costs more than existing practices, the public (or industry) may be happy and willing to pay or, alternatively, should it cost less, the public proves unwilling to participate to a level which makes it work effectively.

MATERIALS AVAILABLE FOR RECYCLING

Typical household refuse composition is reported in Table 1. This analysis is 'as received', i.e. all categories have been handsorted from the refuse mixture and weighed with accompanying moisture and dirt. Many categories include composite items; for example juice cartons contain plastic laminate but are reported as paper, and steel cans with aluminium easy-open ends are recorded in the ferrous category. Thus, although the assay might appear to suggest over 60% of the waste has an identifiable 'scrap' value as recyclable material, estimates of 40%(1) clean scrap are considered more likely to be the case. In practice European and North American household based collection schemes, e.g. Ontario (Canada), Long Island (New Jersey), Munich (Germany), achieve up to 30% by weight materials for recycling. Demonstration collection schemes in the UK, e.g. Sheffield, Milton Keynes, Bury, Leeds, are reporting 18 to 25%. To date, not every potential recyclable material is targetted in such schemes (e.g. Sheffield does not collect film plastic or textiles) because of lack of markets (due to technical and/or economic factors). However it is not unreasonable to conclude that 25% by weight clean recyclables is a technically achievable collection target for most areas in the UK. For this paper, household collection schemes will be selected for more detailed assessment as they have proved to be the most efficient in terms of maximising materials recovery rate. Bring systems and mixed waste sorting plant can and undoubtedly will play a part; for example the bring system (i.e. bottle banks) for glass has distinct technical advantages (colour separation), has been shown to be economically attractive and has an established track record. Ferrous metal recovery from mixed waste RDF or incineration plant can be very efficient (+80% recovery). However for a broad economic assessment it is generally recognised that some form of household collection system will be needed to achieve the target for materials recycling.

Table 1. Typical UK household refuse composition by weight

	Wt%
Paper	33
Plastics	7
Textiles	4
Miscellaneous mixed products	8
Glass	10
Ferrous metal	7
Non ferrous metal	1
Putrescibles (wet kitchen waste)	20
Miscellaneous fine particles	10

This assessment does not include production of compost from household waste or the recovery of energy values. Both these approaches, but particularly compost, can be viewed as 'recycling' operations and certainly they contribute significantly to resource recovery, waste reduction and stabilisation/sanitisation of the waste. However they are more likely to be carried out within the controls of the 'waste industry', because of potential adverse environmental factors and hence be options taken up by or in collaboration with the disposal authorities rather than by collection authorities interfacing directly with merchants and industrial users of recyclables. It is worth noting that compost production is entirely compatible with materials recycling operations and that energy from waste technologies, while providing an alternative recovery route for combustible recyclables, and in some respects a competitive option, would also be capable of treating the residuals from recycling schemes(2), deriving useful energy and assuring further weight reduction prior to ultimate disposal. Thus confining comment to materials recycling by the kerbside collection schemes and the collection authority perspective, the weight and type of materials recovered can be crudely assessed from available information on waste composition, weight arisings and results from operating recovery schemes. Figures given below and in Table 2 have been used in the following sections for calculating costs but are estimates only and do not relate to specific schemes.

Weight of UK household dustbin waste (excluding civic amenity waste)	14 million tonne per annum
Numbers of households in UK	20 million
Weight of waste per house per year	700 Kg/house/year
25% recovery as clean recyclable	175 Kg/house/year

Table 2. Estimated weight contribution of recyclables by broad commodity heading

	Weight per household per year Kg
Paper and board	90
Plastics (bottles)	12
Plastics (film)	5
Glass	40
Ferrous metal	20
Aluminium metal	2
Textiles/rags	6
TOTAL	175

KERBSIDE COLLECTION METHODS AND COSTS

There are a number of different schemes under trial at the moment and at this early stage of development the various benefits and drawbacks are still being assessed.

At Sheffield a single 50 litre blue box is issued to householders. Recyclables collected include paper, glass, plastic bottles and metal cans. The materials are handsorted at the kerbside and placed into a specially designed compartmented vehicle. The vehicle contents are discharged at a local paper merchants premises, subjected to further sorting if necessary, prior to bulking up for onward delivery to users.

At Milton Keynes, two 50 litre boxes are used, red for newsprint and magazines, blue for metals, plastic bottles and glass. Boxes are sorted at the kerbside into wheeled containers carried on a low chassis vehicle. The containers are an integral part of the handling system within the sorting depot.

Both Sheffield and Milton Keynes schemes service the householder weekly, are independent of the normal refuse collection and use one driver plus two to three collectors per vehicle. The vehicle/system design in Milton Keynes appears more efficient, serving approximately 450 households per day as opposed to approximately 350 for Sheffield.

Collection schemes at Bury and Leeds are integral with the normal refuse collection service.

At Bury householders have two wheeled bins, green for mixed recyclables including paper, glass, plastics and metal, brown for the rest. Collected by conventional vehicles on alternate weeks, the green bin loads are delivered for sorting at a local merchant.

At Leeds 4,000 households have a dual wheeled bin system but both bins are split in two. The 'recyclable green' bin takes paper, cardboard and textiles on one side, cans, batteries and plastic bottles the other. The other brown bin has 'organics' (kitchen/

garden waste) one side, residuals the other. Glass is excluded from the collect scheme and recycling for this commodity is via bottle banks. Collection vehicles for the trial are basically conventional units modified by a vertical partition to maintain separation between the materials during transport. For the recyclables the materials are sorted by handpicking from a conveyor at a depot. For the organics, the composting system has yet to be developed. Neither Bury nor Leeds have fully developed sorting or materials recovery facilities (MRFs) but it is reported that higher contamination levels occur with the Bury system. Although both schemes are likely to require more sophisticated handling facilities than the blue box schemes, providing materials quality aspects are maintained, the cost of these should be more than offset by reduced collection costs relative to the separately organised blue box systems.

Although available cost data are limited, in broad terms current collection costs per tonne of recycled material for a 'blue box' scheme are between £120-£150 per tonne of recyclables collected, for the dual bin system costs of between £50 to £100 per tonne are expected. For the separately organised blue box schemes a reduced cost of collecting the residuals can be anticipated. This is already accounted for in the integrated collect schemes.

For assessing costs in this paper, a blue box type scheme is used as the integrated schemes such as Leeds have not been running long enough to provide sufficient information. Additionally the £/t values have been converted to a 'household service' basis equivalent to £17.50 per household per year plus a 'throughput' tonnage cost factor of £10/tonne. This would be equivalent to approximately £110 per tonne for a 25% recovery rate, i.e. slightly less than current estimates reflecting improvements likely to materialise with greater experience. Allocation of a high proportion of the cost to servicing the household is necessary to ensure varying recovery rates can be accommodated in the assessment of costs on a marginal basis (i.e. improving recovery rate reduces costs per tonne).

RECYCLABLE REVENUES AND CREDITS

There are two main cash credits to be accounted for, the savings made on collection of the residual wastes due to reduced weight and volume, and savings on disposal charges.

The collection savings are within the control of the collection authority and, taking the blue box system, it can be anticipated that reduced weight/volume per household of the residual waste will enable some round planning efficiencies to be realised. In modern compaction based refuse vehicles, weight is the main factor and theoretically a 25% weight reduction per house would enable the vehicle to collect from an additional 33% households (assuming extra households also have reduced weight) before returning to the transfer depot or disposal site fully loaded. However as the same number of houses still need to be serviced it is only on the vehicle transport element of collection costs that savings can be realised (e.g. by reducing vehicle numbers) with much less scope for savings on manpower, administration, etc. Refuse collection costs are between £25 and £50 per tonne of which approximately £10 per tonne is the vehicle transport element. Again taking a fixed service element and a variable weight element to assess costs, normal refuse collection has been calculated as follows, £21 per household per year + £10 per tonne (equivalent to £40/tonne for areas with household arisings of around 700Kg/h/year). For this paper it will be assumed that for each tonne of recyclables recovered, the cost of normal refuse collection can be reduced by the variable tonnage element.

Disposal costs range widely from £5 to over £30 per tonne depending on distance and type of disposal site. £15 per tonne is a reasonable estimate for many metropolitan/urban areas. Assuming disposal charges are based on a straightforward cost per tonne basis the full amount should be credited for each tonne of recyclables collected.

It is worth noting that realising the savings from both collection and disposal at the levels indicated will not be straightforward and will certainly not be achieved in the short term. For collection, contractual arrangements, round reorganisation and local logistical factors will all need careful assessment. For disposal, realising cash savings equivalent to the average cost per tonne will be viewed as an unrealistic demand by disposal operators as they are faced with fixed costs which do not reduce in line with reduced tonnage received.

The savings available, and ensuring they are transferred to the recycling operations is the subject of the recycling credit discussed in the *Environmental Protection Act* and further advice from the Department of Environment will be given on appropriate methods for assessing these.

The final and perhaps most unpredictable factor in the financial equation is the revenue from sale of the recyclables. For only three of the commodities, glass, aluminium cans and ferrous metal, can any consistent/reliable value be allocated based on industry wide commitment to (a) take the materials and (b) quote prices which have been relatively stable. Even here one has to be careful with respect to the point in the recycling chain to which the price relates. For example, glass prices of £30-£35 per tonne (colour dependent) are guaranteed for colour sorted materials delivered to the glass plants (or reprocessing centres) — you do not get paid £35/tonne at the 'bottle bank'. As the glass container industry is concentrated in a relatively few specific areas in the UK (e.g. Harlow in the South East, Yorkshire and Central Scotland), onward transport costs can reduce revenue to below £20/tonne in remoter areas. For plastics no real commodity trading market exists in the UK for recovered household plastics. Most schemes collect plastics in close collaboration with the plastics industry and whilst obtaining a revenue, the price is based partly on overseas values and partly to ensure sufficient incentive exists to start the scheme off, an essential stage to enable the plastics industry to gain experience of handling and reprocessing these materials and developing appropriate technologies and markets. For many commodities markets and prices fluctuate widely in response to supply and demand, and negative prices (i.e. you pay for someone to take the material away) are not unheard of in periods of economic downturn. Waste paper is the favourite one to quote as many local authorities have had direct experience of such problems over many decades but paper is not unique; it is worth noting that aluminium ingot prices rose from approximately $1500 per tonne to $3000 per tonne and back down to $1500 per tonne over the space of 12 months during 1989/1990.

For this paper the following prices (Table 3) have been used to estimate revenue from the sale of the collected recyclables assuming reasonable access to markets. They should be taken as indicative only and are very broad brush in the sense that within the commodity descriptions, certain grades attract much lower/high values. Using these prices and weight proportions consistent with Table 2, an expected value for a tonne of collected recyclables would be approximately £30 with the revenues from glass, paper and aluminium being particularly important contributors to the total either due to high weight proportion and/or high price.

Table 3. Estimated revenues from sale of recyclable materials

Commodity	Price £/te	Weight contribution Kg	Revenue contribution £
Paper and board	15	510	7.65
Plastics (bottle)	50	70	3.50
Plastics (film)	30	30	0.90
Glass (colour sorted)	25	230	5.75
Ferrous metal	15	110	1.65
Aluminium cans	500	15	9.00
Textiles	50	35	1.75
		1000	30.20

CALCULATING THE COSTS

The previous sections provide the basic cost and revenue inputs necessary for a simple balance sheet approach to be adopted.

Although the costs of a kerbside 'blue box' type scheme can be assessed in isolation, for a collection authority it is probably more useful to get the feel of the impact on overall costs of the waste collection and disposal service with and without recycling in relation to variables such as disposal charges (and hence the size of the recycling credit) commodity prices and recyclable recovery rates, i.e.

$$\text{Net Cost} = \begin{array}{l}\text{(Existing}\\ \text{refuse service)}\\ \text{Cost without recycling}\end{array} - \begin{array}{l}\text{(Residual refuse service}\\ \text{Cost with recycling}\end{array} + \begin{array}{l}\text{cost of kerbside}\\ \text{recycling service}\end{array}$$

$$Ce \quad - \quad (Cr \quad + \quad Ck)$$

breaking these cost elements down and

$$Ce = n(Ls + Wg.Lt) + n \times Wg \times Cd$$
$$Cr = n(Ls + (Wg\text{-}Wr)Lt) + n \times (Wg\text{-}Wr) \times Cd$$
$$Ck = n(Ks + Wr.\ Kt) - n \times Wr \times Pr$$

where:

n = nos. of households (e.g. an authority servicing 20,000 households)
Ls = refuse collection service charge element £/h/y (e.g. £21)
Lt = refuse collection tonnage element £/t (e.g. £10)

Wg = existing household waste generation rate t/h/y (e.g. 0.7 t/h/y)
Wr = weight recyclables collected per house t/h/y (e.g. 0.175 t/h/y for 25% weight reduction level)
Cd = cost of disposal £/tonne (e.g. £15t)
Ks = kerbside collection 'service' cost £/h/y (e.g. £17.50)
Kt = kerbside tonnage cost factor £/t (e.g. £10/t)
Pr = revenue per tonne from sale of recyclables (e.g. £30/t)

Taking a collection authority of 20,000 households as an example and the 'typical' figures given above the net costs per year would be as follows.

$$Ce = £750{,}000$$
$$Cr = £662{,}000$$
$$Ck = £280{,}000$$

$$\text{i.e. net cost} = Ce - (Cr + Ck) = £192\text{K per annum}$$

From the waste generation rates, a 20,000 household area can expect to produce 14,000 t/annum from which 3,500 tonnes of recyclable material would be recovered at the 25% rate. Thus a cost per tonne of recyclable materials can be calculated (£55/t) a net cost per household (£9.60), yearly cost per householder with or without recycling £48.10 and £38.50 respectively.

It is useful to calculate the cost in various ways partly from a presentational viewpoint but also because different audiences are interested in different cost factors. £9.60 per household for a recycling scheme may be considered less attractive to the public than indicating that the waste service already costs £38.50 and for £48.10 they can have a recycling service as well; both ways may be considered more attractive than saying that for each tonne of recyclables collected, the authority has to pay £55. However if one is talking to the commodity industries and the manufacturers of the products and packaging that ends up in the waste, and trying to get them to support collection schemes, the £55/tonne is a more suitable figure as it relates to the return of raw materials to industry. The Borough Treasurer is more interested in the total figure to assist calculating community charge levels and Central Government might be more interested to take total UK households (20 million) and view the potential cost of the 25% target as being some £200 million.

Table 4 gives example sensitivities of these costs to variations in sales revenue, disposal charges and recovery rates, Figure 1 presents these data in graphical form. More important than the precise numbers, given the uncertainties, are the trends. The first three rows of calculated values in Table 4 fix two factors at the 'typical' level (e.g. revenue and recovery rate) and vary the other (e.g. disposal charge). Under no combination of best and worst case for the variable factor does the recycling scheme break even with net cost per household per year values of between £3.50 (at £50/t disposal charge) and £12.80 (at a 15% recovery rate). If the best case values for both recovery rate and revenues are taken (Table 4), break even occurs at a disposal cost of £25/tonne, a saving of £5.80 per household is achieved at £50/tonne disposal cost and even at the low disposal cost of £10/tonne, net cost per household is only £4 per year. Under worst

Table 4. Kerbside recycling and effect on costs

Fixed variable	Disposal cost £/t	Net cost per tonne recycled £/t	Net cost per house per year £/h/annum	Waste service cost + recycling £/h/annum	Waste service cost — no recycling £/h/annum
Revenue per tonne = £30	10	60	10.50	45.50	35.00
	15	55	9.60	48.10	38.50
Recovery rate 25%	25	45	7.90	53.40	45.50
	50	20	3.50	66.50	63.00
	Recovery Rate %				
Revenue per tonne = £30	15	122	12.80	51.30	38.50
Disposal cost = £15/t	25	55	9.60	48.10	38.50
	35	26	6.50	45.00	38.50
	Revenue £/t				
Disposal cost = £15/t	15	70	12.30	50.80	38.50
Recovery 25%	30	55	9.60	48.10	38.50
	45	40	7.00	45.50	38.50
“BEST CASE”	Disposal Cost £/t				
Revenue = £45/t	10	16	4.00	39.00	35.00
Recovery = 35%	15	11	2.80	41.30	38.50
	25	0	0	45.50	45.50
	50	(-24)	(-5.80)	57.20	63.00
“WORST CASE”	Disposal Cost £/t				
Revenue = £15/t	10	142	14.90	49.90	35.00
Recovery = 15%	15	137	14.40	52.90	38.50
	25	127	13.30	58.80	45.50
	50	102	10.70	73.70	63.00

case revenue and recovery rates (row 5) even an avoided disposal charge of £50/tonne results in net cost per house of £10.70 per year. Obviously disposal charges (and hence the recycling credit) are one factor which can be expected to increase with time as standards improve under the EPA and duty of care requirements, they will make recycling more attractive but as Figure 1 shows very clearly the rate of cost increases for waste management can only be slowed down by recycling, not reduced, and using current information blue box type recycling systems will start off from a higher cost base.

It is premature to draw too many conclusions from this cost analysis for kerbside collection schemes. As mentioned, current schemes are in their infancy and start up costs are inevitably high given the need for specialised vehicles, current small scale of operation, lack of experience, intense publicity effort to educate the public etc. but it should also be borne in mind that where such schemes are most widespread, e.g. North America and Germany, disposal charges in excess of £50 per tonne are not unusual. Thus it is vital that the existing kerbside collection schemes are carefully assessed and options for reducing the running costs thoroughly investigated (e.g. a number of kerbside collect schemes are now one man operated in the USA(3)). For the integrated collection schemes such as Leeds, the inclusion of 'compost' is a particularly valuable exercise as this could reduce residual waste for disposal to 50% or less. If revenue from compost sales can cover the cost of running the composting process, break even at a disposal charge of £30 would be achieved at the 25% recyclable material yield and £30 per tonne recyclable revenue rate. A lower break even disposal charge will be achieved if the running costs of the integrated service prove in practice to be significantly less than the values calculated for the blue box approach.

CONCLUSIONS

The question "recycling, can local authorities make it pay?" is not an easy one to answer at this stage. From a strict cost viewpoint available information and experience suggests that going to separate kerbside blue box type collect systems to achieve high recovery (as opposed to using bring systems) will cost more. Significant reductions in the running costs need to be achieved compared to the pilot schemes currently operating as even under favourable recovery and revenue values, disposal charges well in excess of £30 per tonne are needed to break even.

Obviously it is early days for a definitive cost assessment and reduced running costs for collection, particularly for collection schemes fully integrated with the normal refuse service, can be expected as experience grows. The need to maintain support for existing schemes and encourage new initiatives (particularly those showing benefits of scale up or extended recovery e.g. compost) is essential to enable high recovery level collection schemes to develop and improve efficiency and provide reliable cost data. These schemes are also needed to supply bulk quantities of materials for industry to develop processes and markets for reuse and this latter aspect is critical in terms of establishing more stable market conditions for reclaimed materials whether recovered by collect schemes, bring schemes or from non domestic sources.

Concurrent with demonstrating the high recovery rate schemes, the local authority sector should maintain commitment to growth in the provision of bring systems. These have generally proved viable or at least sustainable at modest cost under the less favourable climate overall for recycling prior to the EPA. They provide a sound springboard for future change over to collect systems as they still develop an authority's links with and knowledge of the industrial users of recyclables as well as developing and maintaining the public commitment to the recycling concept.

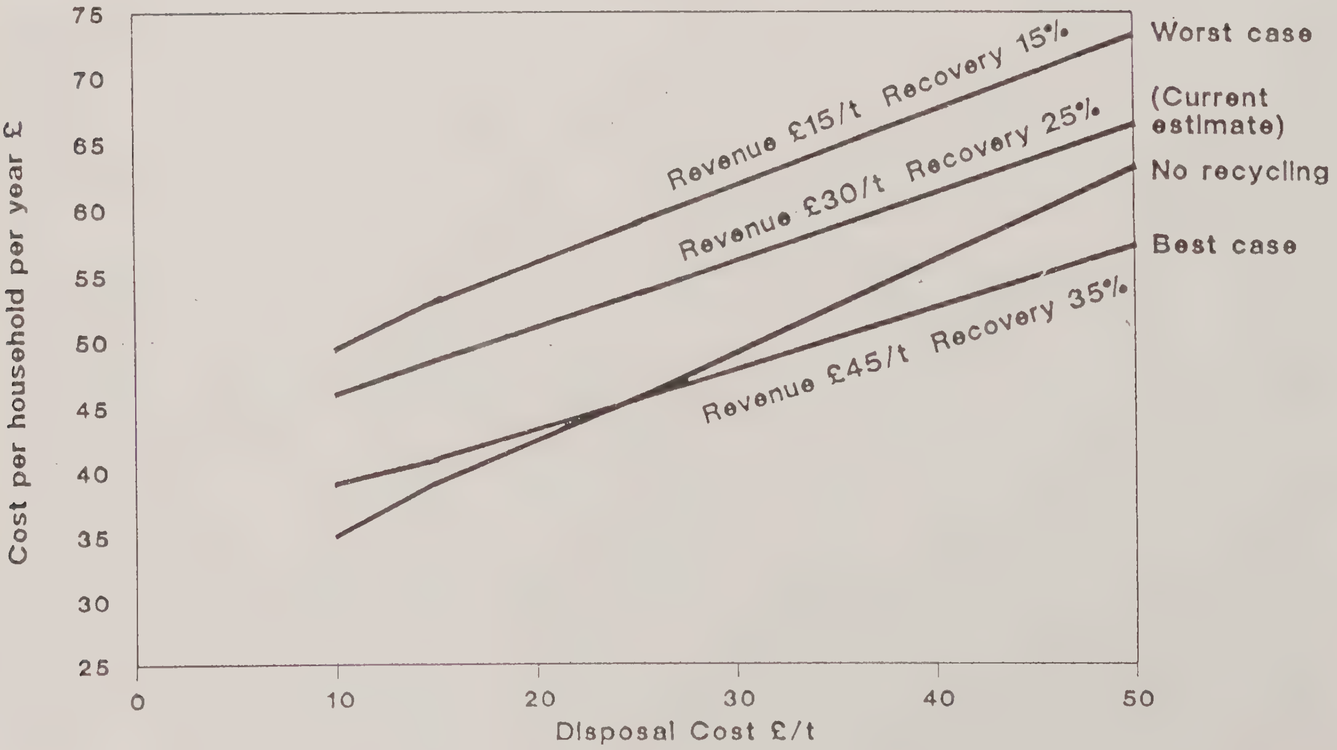
The fact that a recycling scheme may cost more does not mean that it is a service that should not or cannot be provided. The public, their representatives in Government (local and national), and many voices in industry want to see it happen and the *Environmental Protection Act* demands that it be considered and plans drawn up. On currently available information, albeit very sketchy, an additional cash cost input of perhaps £200 million per year is needed for adoption of high recovery schemes throughout the UK excluding investment requirements in industrial processing capacity to reuse the materials. Industry e.g. by levies on packaging and newsprint, could be a source of funds, the householder could be charged extra, Government could tax disposal to raise additional funds.

A view needs to be taken on whether the wider environmental benefits, i.e. the savings in material and energy resources available by recycling as opposed to disposing these products, warrants more positive steps to ensure the economics are made to work at the local level. The public demand, the provisions of the EPA and the increase in disposal costs are creating a more favourable climate but on current evidence the cash costs are likely to inhibit widespread adoption of high recovery schemes if local authorities are expected to shoulder the full burden alone.

REFERENCES

1. Barton, J.R. Recycling for Packaging: Source Separation on Centralised Treatment. IWM Seminar ‘Packaging, Waste Management and the Consumer’, 4th October 1989, London.
2. Barton, J.R. Materials Recycling and Wastes Management. Warmer Bulletin 25, Summer 1990, England.
3. Comprehensive Curbside Recycling, Collection Costs and How to Control Them. Glass Packaging Institute, Washington DC, 1988.

Fig. 1 Estimated Costs for Waste Disposal and Recycling Operations



TAXING POLLUTION

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This paper is based on Dr. Helm's presentation to NSCA's 1991 workshop.

I. INTRODUCTION

The current debate about pollution control in the UK has tended to focus on the setting of targets rather than on the instruments to achieve them. For example, carbon dioxide and sulphur dioxide targets have been set, along with river quality objectives.

Targets are an essential part of pollution control. However, in much of the recent discussion, little attention has been paid to the design of regulatory instruments and the appropriate institutional structures to achieve them. There is, for example, no clear plan for the achievement of the carbon dioxide target by 2005, and only a watered-down flue-gas desulphurisation scheme for power stations to reduce sulphur emissions. The new targets for water quality are being met through a shifting of the implementation onto the newly privatised businesses.

There are broadly two approaches to the design of economic instruments for pollution control. These are use of the market-based mechanisms and command-and-control. Their relative attraction varies on a case-by-case basis. However, a number of general characteristics point in favour of market-based mechanisms, and it is these arguments which will be the primary focus of this paper.

II. TRADITIONAL APPROACHES TO POLLUTION CONTROL

Pollution is one example among many of market failure — where the private market fails to allocate resources correctly. Other examples include monopoly, public goods and lack of information. In a number of such cases of market failure the state commands resources on behalf of individuals and controls their uses. For example, the state chooses how much education most children will receive, decides how many tanks the army will buy, how much money the BBC will receive and, through regulation, sets the prices of electricity, gas and water to domestic consumers.

With regard to pollution, command-and-control techniques have been the norm. From the Alkali Acts onwards, civil servants have decided on a plant-by-plant basis the level of pollution and have agreed consents on the quantities produced. Over time the techniques have of course become more sophisticated, with the eventual development of BATNEEC.

These traditional methods are extraordinarily demanding to implement. Consider, for example, the amount of information required to set a BATNEEC target for a power station. First, the pollution must be measured. Second, the civil servant must identify the different technologies available for producing power. Third, data must be collected on the costs of alternative technologies. Fourth, alternative methods of reducing pollution from other sources, and across industry, need to be evaluated. Even the most public spirited civil servant would be hard pressed to get the right answer.

Of course, in practice the methodology cannot hope to be so thorough. Much more rough and ready estimates have to be relied upon. The desired and actual information sets typically diverge significantly.

It is not therefore surprising that these traditional command-and-control approaches have a mixed and frequently poor record. In particular, they suffer from the consequences of:

- ★ high costs of information
- ★ civil servant incentives
- ★ high costs of implementation

The costs of mistakes can be very high indeed. A classic example is the fitting of flue-gas desulphurisation units to power stations to meet the sulphur dioxide targets required under the EC Directive on Large Combustion Plants. The costs of fitting units well exceed the costs of building new gas combined cycle plants. Civil servants have not, on the whole, been good at selecting the most cost-effective technologies.

The question then arises as to whether any other approach to pollution control is more economical in its informational demands and provide better incentives. In particular, are there any methods of getting the market to solve the problem?

III. TAXES AND PERMITS

The great merit of the price mechanism has been its ability to transmit information. Prices signal alternative costs to businesses, who then choose least cost solutions in order to maximise profits. Thus any method which devolves the implementation to businesses with profit seeking incentives should have an advantage over traditional command-and-control. It should in principle cost less to implement, and be less prone to mistakes.

The most natural method then is to directly alter prices. "Correct" prices would transmit "correct" information. The instrument is taxation, since taxation acts directly on prices. It alters the perceived costs to the purchaser, and therefore encourages substitution towards those methods of production which are less heavily taxed.

In principle, then, policy makers could adjust up the prices of goods and services which created pollution in their production, distribution and consumption, and adjust down the prices of more environmentally benign products. Thus petrol and coal-generated electricity would be highly taxed, whilst windmills and organic farm products would be lowly taxed.

The informational demands however are still high. The policy maker needs to know the level of pollution from each activity. However, the difference is that technology is not relevant. Once the tax is in place, businesses have every incentive to seek out environmentally benign technologies, since this will maximise profits. Taxes therefore allow decision making to be devolved. This advantage is critical.

Two residual problems remain. The first is that the taxes would in practice have to be very high on some items — like electricity and transport. This however is merely a reflexion of an unpleasant fact of life — that it is very expensive to reduce pollution from these sources. Rejecting taxes because they will have to be high does not abolish the problem. Rather the burden will be shifted elsewhere. There can however be no escape.

The second problem is much more daunting. This is the income effect of the taxes. Environmental taxes will fall most heavily on those items which make up a significant proportion of the household budgets of the poor — electricity, transport and water. Without consequential adjustments in social security, their impact on the distribution of income is very regressive. If governments fail to compensate the poor, the choice is between poverty and the environment.

There is a further, nasty, twist to this second problem. If the poor are given back the money they lose in the tax, they may spend a considerable proportion of it again on the polluting activities. There is therefore an income effect: marginal additional income may increase demand for goods and services by polluting processes. Energy demand in particular rises with economic growth. Thus, idea that there is no conflict between economic growth and the environment is a fiction. Although growth can be benign, there is little doubt that rising living standards are associated with increased energy demand. Although energy conservation may improve the environmental pollution in the short run, in the long run, supply side solutions are required. A very radical switch to non-fossil fuels will therefore be needed to reduce emissions.

IV. SETTING TAXES

The regulator is still left with the need to set taxes. In doing so, there are a variety of practical steps that need to be considered. These are:

- whether to tax the emission directly or a proxy;
- how to phase in the tax;
- how to adjust the tax through time;
- how to monitor performance.

Each creates informational problems. One approach is to recognise the informational difficulty in setting taxes and to use the tax itself to gain information. Since environmental taxes should typically be designed to meet medium term targets, the important starting point for a tax when introduced is to change behaviour through changing expectations.

Consider, for example, the carbon dioxide target. The government could announce that it intended to achieve the target in a series of stages by the use of a tax. It would then set an initial level and observe what happens. If emissions did not fall enough, then the tax would rise, and vice versa. Provided the private sector believed the government would stick to its targets, then the expectation itself would push them towards more benign technologies. The obvious analogy is with inflation and monetary targets. The government decides to try to reduce inflation. It allows the interest rate to go up and down to meet that target, in this case indirectly through the monetary aggregates.

This idea of medium term environmental strategies for major pollutants allows one to marry instruments to targets. The objective becomes credible, and the informational demands are relatively weak. The idea could be extended: it could be used in such widely divergent cases as water pollutants, differentials in leaded versus unleaded petrol and noise levels at airports.

V. IMPLICATIONS

The above discussion may seem some way away from the *Environmental Protection Act.* Indeed, it is. However, these differences are instructive. They demonstrate first that, for all the discussion of taxes, the government is not yet serious about using these instruments. Its notion of charging has so far been limited to the completely separate issue of who should pay for regulatory bodies' costs. This is a public expenditure issue, and indeed charges are not particularly attractive in addressing this issue. They create little incentive to minimise the costs of regulation.

This emphasis on regulatory cost recovery has a further undesirable consequence. It leads regulators to see charging and taxing instruments as additional to BATNEEC, whereas the real merit of taxes is as a displacement for BATNEEC. Taxes are substitutes not complements to traditional command-and-control techniques.

The 1980s saw a sharp movement away from picking winners, the idea that civil servants could make good business decisions. Unfortunately that development has not yet permeated pollution control. The sooner that happens, the sooner civil servants can concentrate on their real tasks — evaluating targets for pollution reductions, monitoring pollution, and penalising those responsible. The tax system, rather than consents and courts, is in many cases the appropriate mechanism for making polluters pay. Of course there will always be prohibited substances and a need for an inspectorate — but largely for those areas where the optimal pollution level is zero or where market-based mechanisms are too expensive to implement. Fortunately, most major pollutants — like cars and power station emissions — fall well outside these categories.

INTERNATIONAL ASSOCIATION AGAINST NOISE

ADVANCE NOTICE

The 17th International Congress of the Association Internationale Contre Le Bruit will take place from 1-3 September 1992, at the Technical University, Prague, Czechoslovakia.

The theme of the congress will be "Objectives for Noise Abatement in the Future Europe". Congress languages will be Czechoslovak, German, English and French.

For more information contact Dr. Willy Aecherli, General Secretary, AICB, Hirschenplatz 7, CH-6004 Lucerne, Switzerland.

BRIEFING

CONTROL OF NOISE POLLUTION

Late in 1989, the Government set up a working party to review noise policy. The review group was chaired by James Batho and its report and recommendations published in October 1990 (see *Clean Air,* Vol. 20, no. 4). In a speech to a Noise Council Seminar on 15 May, Tony Baldry (Under Secretary of State for the Environment) highlighted some of the action already taken on the Batho Report's recommendations; he also outlined some of the areas for further Government action.

"We decided to take our present policy initiative in late 1989. There had been no review of noise policy for some time and we were aware of the recent steep increase in complaints. We therefore decided to set up an independent Noise Review chaired by James Batho and we invited the Noise Council to nominate a member. The Batho working party worked through the Spring and Summer last year and we published their report together with our initial response last October.

"During this period the Environmental Protection Bill was before the House. We had in mind some improvements in the statutory nuisance code and the draftsman took the opportunity to consolidate the nuisance provisions in the 1936 Act with the noise provisions in the 1974 Act. In general we used the noise code as the more recent and satisfactory model, but some changes have resulted. The maximum fine for breach of a noise abatement order on trade or business premises has been substantially increased. A citizen must give notice to a noise maker before approaching a magistrates' court direct. Also, we took the opportunity to amend the Bill to give effect to one recommendation which we knew would emerge from the Review. We have clarified the duty on local authorities to take reasonable steps to investigate complaints.

"In addition to the Review and the Environmental Protection Bill, we also produced a White Paper during the same period with a chapter on noise. You will have recognised a good deal of the Noise Review Working Party's thinking in the White Paper and I am most grateful for their contribution.

"Our first policy aim must be to protect people from direct damage to their health from noise. I think we have achieved that in respect of travel, the home and the workplace. Less so perhaps in respect of leisure activities. Beyond that, we want to protect people from noise nuisance as far as we can without interfering with personal freedom. We acknowledge of course that persistent nuisance can result in health problems from stress and lack of sleep. The approach in practice is double headed: control on sources of noise and protection for people.

Planning and Noise

"Let me now review progress so far on the Batho recommendations. It would be most logical to start with planning. We are rewriting the old Planning & Noise Circular 10 of 1973 as a Planning Policy Guidance Note and hope to consult on the text in the autumn. We shall be incorporating the Review's concept of 3 noise exposure bands and consulting on the decibel limits appropriate to each level. We are also planning to consult on a Minerals Planning Guidance Note to give advice on the rather special problems of noise from surface mineral workings.

Transportation Noise

"Now I turn to travel. The freedom to travel inexpensively has become a great advantage for many. Great progress has been made in taming the aircraft and the car engine in particular. But that has not put an end to the complaints, partly perhaps because of rising expectations, partly because roads are being built in previously quiet areas and partly because the intensity of traffic is increasing everywhere.

"First roads. We are looking at the anomaly whereby noise abatement orders can apply to any buildings or land but not to the public highway. Our targets are things like the parking and use of generators on the highway and unreasonable use of loudspeakers. However, we must proceed in such a way as to avoid conflicts with highways law — a complex area. Moving vehicles and other legitimate uses of the highway which are already controlled by other legislation would have to be exempted or otherwise dovetailed into the system. We are also taking steps through the European Community to improve the quality of car alarms and enforce a mandatory cut-out after 30 seconds. Research to assess whether the 68dB threshold is still appropriate will be added to the existing programme on the environmental effects of road schemes, as and when resources allow.

"The Working Party recommended a sliding scale for noise insulation given to those affected by new roads. This aimed to cushion the apparent unfairness by which one householder can get double glazing and a neighbour suffering 2 decibels less can get nothing. I fully appreciate this point, but think we need to take a wider view of the problem. All those affected by new roads are entitled to money compensation for *any* drop in value of their homes connected with the new road and caused by noise and certain other factors. Such compensation is not limited by an arbitrary cut-off decibel level. The two schemes together provide a fair and flexible system of compensating people who have to suffer significantly increased noise levels from new roads. My colleagues in the Department of Transport are satisfied that both schemes are well publicised and well used in respect of their schemes. It is for local highway authorities to consider whether their publicity arrangements are adequate. The two schemes have to be looked at together: the introduction of a sliding scale for insulation would have perverse effects on compensation.

Turning to rail, the Working Party are right to draw attention to the lack of parity with roads. However British Rail have done and continue to do a great deal to reduce noise at source and it is now more a matter of setting statutory standards and looking at procedures. The Mitchell Committee has recommended standards of noise insulation for those who live near new railway lines which they consider to be analogous to those for roads. The Government has published the Mitchell report and has invited views on it from British Rail, other railway operators and other interested parties. Environmental assessments will henceforth form part of the procedure for proposals for new railway lines, whether under the Private Bill procedure or under whatever replacement procedure the Government decides to recommend to Parliament. Assessment of noise has clearly been a factor in the proposals British Rail has been drawing up for a Channel Tunnel Rail Link.

"On both road and rail, consideration is being given to whether insulation should be provided for those who suffer greatly increased noise from intensification of use of an existing road or line. This is not without its difficulties. I recognise the nuisance for those affected, but there are great difficulties in defining an intensification or a permanent traffic management scheme, and huge expense if we get the definitions wrong. The Government is giving the question serious thought, and we will declare our conclusions as soon as we can.

"Now to air travel. The greatest benefit to the greatest number of people has undoubtedly been achieved by reducing the noise made by commercial jet aircraft. The latest generation of civil jet aircraft are several times quieter than earlier equivalent types. By 2002 only those aircraft that can meet the standards of the latest generation of aircraft will be allowed to operate in Europe. The UK has been at the forefront of achieving international agreement to this. In addition airports and airfields operate a number of local measures designed to minimise the annoyance caused to local people from aircraft noise. These are backed by powers in the *Civil Aviation Act 1982,* which the Secretary of State for Transport is currently reviewing to see whether any changes are desirable. The Noise Review Working Party also expressed concern about take-offs and landings away from licensed airfields particularly by helicopters; and it discussed activities such as ground running which take place on airfields but are not subject to general controls but only to local agreements (which may be voluntary). These issues are also being considered by the Secretary of State for Transport in conjunction with my Department, and we expect to announce our conclusions and any proposals for change soon. Within my Department we are also considering whether any action is needed on the planning side to limit the temporary use of land by helicopters.

Domestic Noise Sources

"Noise in the workplace was not within the Working Party's terms of reference, but they did look carefully at noise in the home. The construction of a house or flat has a great impact on the transmission of noise between adjoining dwellings. We have accepted the Working Party's recommendation that the noise insulation standards for flat conversions should be as close to new build as is practical. We are also amending the Building Regulations so that insulation against airborne noise is required for all kitchens in addition to living rooms and bedrooms.

"On advice from the Building Regulations Advisory Committee we did not think it sensible to create new notifiable stages in house construction for the inspection of noise insulation. Such insulation work is done throughout the construction process and no single stage can be sensibly identified. But all this does not mean that noise insulation will not be inspected during construction. Far from it. A building control inspector will normally visit a site to check that the work complies with all the requirements of the

Building Regulation. Also, most new dwellings are covered by warranty schemes which will usually provide yet another level of site inspection.

"The Working Party suggested a noise performance test which could be used to check compliance with the Building Regulations. I can see how at first this might be attractive, but there are difficulties in using such a test in the context of the Regulations. Even if a builder follows the Regulations to the letter, the noise performance of a dwelling cannot be accurately predicted. And the ultimate penalty for failing to comply with a Regulation is severe — demolition! I think we are more likely to achieve the Working Party's policy objective by developing a voluntary noise certification scheme run by the private sector. So I am commissioning research, in line with the Working Party's recommendation, to find out if a reasonably inexpensive but accurate test can be devised.

"On the related issue of burglar alarms, the Home Office have written to the National Approval Council for Security Systems. I for one would be very pleased to see alarms made to cut out after say 20 minutes.

"Noise from neighbours generates most complaints and in some ways is the most intractable topic because individual freedoms are involved as well as nuisance. It must be sensible for neighbours to try to sort out problems among themselves before invoking the local authority and the law. With that in mind I am delighted to say that our first pilot "Neighbourhood Noise Awareness" scheme has just been launched in the Forest Hill area of Lewisham. The idea is that a local group of residents come together, in this case in an area of about 1100 dwellings mixed in both form and tenure. A leaflet has been prepared for the residents suggesting ways in which the impact of noisy activities can be restricted. Anyone who is suffering and cannot secure an improvement by a direct approach can drop a note into the local authority neighbourhood office and the complaint will be followed up. My Department has funded the development work and we shall be very interested to see how things go. I wish the scheme every success.

"The initiative in all such schemes will lie with residents. The leaflet will say whatever they want it to say — there is no national model telling people what to do. Neither is there necessarily any desire to prevent individuals from doing particular activities — the objective is to make people think about the disturbance they may be causing and the times of day that this may be least irritating. However, where disputes arise the scheme will enable communities to settle these without recourse to court action. The power for an individual to go to court in the last resort remains unchanged.

"We have given a good deal of thought to complaints about noisy private parties. Neighbours are furious that a local authority officer and the police can arrive at the scene of a party and yet apparently be powerless to stop it in its tracks. The officers face several obstacles — making a noise is not in itself a criminal offence, the name of the organiser cannot be ascertained, the noise maker cannot be arrested. There are problems of natural justice in making the owners of premises responsible even if they are not there when the party is held. It may however well be possible for council officials temporarily to remove equipment such as loudspeakers, with police support where appropriate. I want to look again at the provision in Scotland whereby it is an offence not to desist from making a noise when requested by the police.

"I understand from the report and from a recent conference that the control of noise from commerce and industry in mixed residential areas is not completely satisfactory. We shall be writing to the British Standards Institute about the recent revision of BS4142. We are also looking at the regulations on noise abatement zones. Modern technology ought to allow us to make the regulations much simpler and more useful.

"We are all part of the noise problem at various times because of our noise-making activities. We can also be a part, a major part, of the solution by being considerate to others. There are already a number of educational initiatives and leaflets around and there is scope for more initiatives to change peoples' perceptions as to what to say, as individuals, can do to help. We are determined to make progress, and are making progress, in a whole range of areas. This report is an update to show where we have reached so far."

ENVIRONMENTAL PROTECTION ACT 1990

Various Regulations implementing Part I of the EPA, together with final details of charging schemes for both IPC and local authority air pollution authorisations in England and Wales, were published at the end of March.

The *Environmental Protection (Prescribed Processes and Substances) Regulations 1991* largely follow the draft published at the end of 1990 (see *Clean Air,* Vol. 20, No. 4). The Regulations also include a timetable for implementing IPC in Scotland from 1 April 1992: this is the same as that applying in England and Wales (*Clean Air.* Vol. 21, No. 1), except in the case of large combustion processes which must apply for an authorisation from 1 April-30 June 1992.

For Part B local authority controlled processes in Scotland, applications for authorisations will be required exactly one year later than their counterparts in England and Wales; however only four (instead of six) months will be allowed from the initial date for submission of applications. In England and Wales local authorities will have 12 months in which to process applications relating to existing processes; nine months will be allowed in Scotland.

The *Environmental Protection (Applications, Appeals and Registers) Regulations 1991* detail the procedure to be followed by operators of processes scheduled for either IPC or local authority air pollution control when applying for an authorisation. The Regulations apply from 1 April 1991 in England and Wales and from 1 April 1992 in Scotland. The Regulations outline the information to be included in an application for an authorisation and for consent to vary conditions of an authorisation; details for consultation and advertising the application in relevant newspapers; appeal procedures and information to be kept on the public register. The Regulations also provide exemptions from the procedures for certain waste oil producers and in cases involving information affecting national security or which is commercially confidential.

The *Environmental Protection (Authorisation of Processes) (Determination Periods) Order 1991* varies the determination period for certain applications. For applications which may affect national security or commercial confidentiality, the determination period is four months from the date following completion of consideration of such matters.

For existing processes requiring a LA authorisation, the Order allows 12 months for consideration of an application in England and Wales (four months is specified in the Act) and nine months in Scotland. A period of 14 days is specified for new small heating installations using waste or recovered oil (e.g. heaters in commercial premises using oil drained from vehicles); For other existing small heating installations using waste or recovered oil, a period of 18 months is specified (15 months in Scotland).

The *Disposal of Controlled Wastes (Exceptions) Regulations 1991* are concerned with potential overlaps between the licensing requirements of the *Control of Pollution Act 1974* and of the EPA. They exempt generally from the licensing requirements of the 1974 Act any disposal as part of a process subject to central (integrated pollution) control which has been authorised under Part I of the 1990 Act and any disposal described in the Schedule forming part of a process subject to local (air pollution) control which has been so authorised. There is, however, an exception in relation to the final disposal by deposit in or on land of controlled waste as that operation is expressly excluded from regulation under Part I of the 1990 Act.

Fees and Charges for Integrated Pollution Control 1991, published by HMIP, details the way in which costs are calculated and the scales which apply (these are likely to be revised in April 1992). The main elements of the scheme for which there are three categories of charges are as follows:

- Application fee (covering consideration of each IPC application): £1,800 per component, or £1,200 per component if the process is currently regulated for air releases by HMIP.
- Subsistence charge (payable annually covering the cost of inspection, monitoring and enforcement): £500 times the number of components in the process. Processes involving a release to controlled waters will be subject to an additional charge levied by the NRA; both charges will be paid to HMIP who will reimburse the NRA.
- Substantial variation fee: One third of the application fee (i.e. £600).

The *Radioactive Substances Fees and Charges Scheme* is substantially the same as that proposed in the consultation document published in July 1990.

Band 1 and 2 premises — i.e. BNFL Sellafield and 30 or so nuclear power stations and other premises subject to licensing under the *Nuclear Installations Act 1965* — will be charged individually on the basis of the actual regulatory time and costs incurred.

For Band 3 operators (e.g. major laboratories, major industrial users), the application and variation fees will be £800, and the annual subsistence charge £400. For Band 4 operators (e.g. smaller industrial users), the application and variation fees will be £300. The annual subsistence charge will be £75, but this will apply only to those holding larger closed sources. The majority of Band 4 operators, holding smaller closed sources will not pay any annual charge, since these sources do not require routine inspection.

Local Enforcing Authorities Air Pollution Fees and Charges Scheme 1991: A charge of £800 will be payable for each application except for processes previously registered under the 1906 *Alkali Act:* in these instances the application fee will be £530. For waste oil burners with a net rate thermal input not exceeding 0.4 MW, the fee will be £100. An annual subsistence charge of £500 will be payable (£100 in the case of a small waste oil burner). A charge of £530 (£65 small waste oil burners) will apply for substantial changes to an authorisation.

General Guidance Notes

Five Guidance Notes on the operation of local authority air pollution controls have been published. These are intended to serve as a manual for local authorities, but are also of use to operators of processes covered by the controls. The notes cover the following:

GG1 — Introduction to Part I of the Act, ISBN 0-11-752423-9 (£5.00).
GG2 — Authorisations, ISBN 0-11-752424-7 (£3.75).
GG3 — Applications and registers, ISBN 0-11-753425-5 (£4.00).
GG4 — Interpretation of terms used in process guidance notes, ISBN 0-11-752426-3 (£1.90).
GG5 — Appeals, ISBN 0-11-752427-1 (£1.90).

Further draft Process Guidance Notes have also been published:

PG2/3	Electrical and Rotary Furnaces
PG3/14	Lime Slaking
PG6/7	Printing and Coating Metal Packaging
PG6/8	Textile and Fabric Coating
PG6/10	Coating Manufacturing
PG6/13	Coil Coating
PG6/14	Film Coating
PG6/15	Coating in Drum Manufacturing and Reconditioning
PG2/9	Metal Decontamination
PG3/8	Quarry and Roadstone Plant
PG3/12	Plaster
PG3/13	Asbestos

UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT

RIO DE JANEIRO, JUNE 1992

The 1972 Conference on the Human Environment provided an unique forum for hundreds of delegates from industrialised and developing nations to explore a wide variety of environmental issues and to try and understand each other's problems in dealing with them.

The reports on that meeting make interesting reading: climate change, energy use, air, sea and land pollution, conservation of the world's resources and the need for "measures to arouse public support to protect the environment" are all mentioned. Other concerns of the 1970s include the effects of CFCs on the stratospheric ozone layer, vehicle pollution and the need to conserve energy. Indeed, a delegate to the 1972 UN Conference stressed the need for "mankind drastically to re-orientate its way of living while there was still time".

That conference led to the establishment of the UN Environment Programme which has played a central role in progressing the issues raised at the Stockholm Conference. The 1987 report of the World Commission on Environment and Development (the Brundtland Commission) — *Our Common Future* — took the discussion on the environment and the needs of humankind a stage further by focussing on "sustainable development" as an imperative — i.e. to "meet the needs of the current generation without compromising the ability of future generations to meet their own needs".

Now, twenty years on, the UN has resolved to hold a "United Nations Conference on Environment and Development (UNCED)", to find ways to "halt and reverse the effects of environmental degradation" while increasing efforts "to promote sustainable and environmentally sound development in all countries". The Secretary-General of UNCED is Maurice Strong, who was the first Secretary-General of UNEP. The article below by Maurice Strong is taken from the March-April 1991 issue of *Development Forum.*

UNEP-UK

In the UK, the National Committee for UNEP has developed a programme of events and reports leading up to the 1992 Conference, with the aim of broadening UK involvement in and raising awareness of international environmental issues. UNEP-UK includes NGOs, scientists, academics, MPs, industrialists and government representatives. For more information contact Koy Thomson, The UNEP-UK Secretariat, c/o The International Institute for Environment and Development, 3 Endsleigh Street, London WC1H 0DD.

ON THE ROAD TO RIO 1992

Maurice Strong
Secretary-General, UNCED

In a little more than a year from now, in June 1992, the leaders of the nations of the world will gather in Rio de Janeiro, Brazil, for a conference which could well determine the fate of the earth. The United Nations Conference on Environment and Development is expected to be the largest summit ever and the most important — the first Earth Summit. At it, the highest-level participants, including heads of state and government, will be taking decisions which will shape the prospects for the human future as we prepare to enter the new millennium.

These prospects are ominously clouded by mounting evidence that wasteful and destructive human activities are undermining the capacity of our planet to provide a secure and hospitable home for all its peoples, both rich and poor. The massive oil spills in the Persian Gulf have demonstrated dramatically that the environment can be a victim of war as well as an instrument of war and of terrorism. Meanwhile, world population and human activities continue to grow, escalating the pressures on the environment and resource base and the risks of global warming, ozone depletion, pollution of air, water and the food chain, and destruction of forests, soil, plant and animal life.

The stakes are high — nothing less than the survival of life on earth. The changes that we must make in our behaviour and in our international relations are fundamental and extremely difficult to achieve. But the fact that they are imperative produces a powerful incentive to mobilise on an unprecedented scale our capacities for political, economic and social innovation and leadership. This must be manifested at every level from the behaviour of individuals to global cooperation. Such cooperation can only be based on common interests of all humanity.

Human activities have created a technological civilization that is now global in scale and pervasive in its influence on the lives and the prospects of all members of the world community. It has produced a new kind of world with stark dichotomies between the benefits enjoyed by the few, the deprivation and suffering experienced by the majority, and the growing risks to the future of all.

The unprecedented increases in human numbers and activities that have occurred since the industrial revolution, and particularly in this century, have given rise to the deterioration of the environment and the depletion of natural resources that threaten the future of the planet. It is ironic that these impacts have occurred largely as a result of the same processes that have produced such unparalleled levels of wealth and prosperity, particularly in the industrialised countries. The gross imbalances that have been created by the concentration of economic growth in the developed nations and the high rates of population growth in the developing ones are at the centre of the current dilemma.

Redressing these imbalances will be the key to the future security of our planet — in environmental and economic as well as in traditional security terms. While there is widespread acknowledgement at the level of principle as to the need to achieve a sustainable balance between environment and development, it should be no surprise that the perspective of developing countries on these issues differs from that of industrialised countries. The developing nations point out that their industrialised counterparts are largely responsible for these risks and have been the beneficiaries of the wealth that has accumulated through the processes of economic growth. They insist that they cannot divert resources required to meet the most immediate and fundamental needs of their people to pay the additional costs of incorporating into their development policies and practices the measures needed to ameliorate major global risks.

These concerns were a primary consideration in the decision of the General Assembly of the United Nations in late 1989 to convene the Earth Summit in Brazil in June 1992. It coincides with the twentieth anniversary of the United Nations Conference on the Human Environment held in Stockholm in 1972 which put the environmental issue on the agenda of the international community. But it will be no mere commemorative or nostalgic event. It will be aimed at placing the world community on the pathway to a more secure, sustainable and hopeful future as we move into the twenty-first century.

To do this, it must produce agreement on the basic principles and broad range of actions required to make the kind of transition to a sustainable future envisaged in *Our Common Future*, the historic report released in 1987 by the World Commission on Environment and Development. That report made clear that only environmentally-sustainable development can meet the future needs of the world community, and particularly of developing countries, for continued economic growth. It rejected "no growth" as a goal, while pointing out that it would be the inevitable result of continuing on the current pathway of environmentally destructive and unsustainable development.

The 1992 conference literally deals with environment *and* development. This recognizes the important reality that environmental impacts arise as a result of our economic behaviour and can only be addressed effectively by changes in that behaviour, on the level of individuals as well as governments and corporations. Thus its main task will be to move the environment issue into the centre of economic policy and decision-making.

Growing recognition of the need for this transition provides the primary basis for the issues to be addressed at the Earth Summit. They include climate change, transboundary pollution, waste management, the protection of land resources, the conservation of biological diversity, the management of the oceans and coastal areas and the quality and supply of freshwater resources. Virtually all of them are currently the subject of important programmes and activities at the national level, within the United Nations and in the internal non-governmental community.

"People power" will be the key to the success of the Earth Summit. The proposals that will be placed before the leaders of world governments assembled in Rio de Janeiro will be the product of an intensive process of preparation under the direction of a preparatory committee consisting of representatives of all United Nations member governments. But they will reflect the contributions of a broad range of NGOs and constituencies including science, education, culture, industry, trade unions, religion, women, youth and indigenous peoples. The decisions taken by world leaders on these proposals will be based primarily on the political will manifested by the interest and concern of their people. And, equally, implementation of the decisions of the Earth Summit will depend largely on the commitment and actions of people.

In this transition to a more secure and sustainable future, the industrialized countries must clearly take the lead. They have developed and benefitted from the unsustainable patterns of production and consumption which have produced our present dilemma. And they, primarily, have the means and the responsibility to change them.

The Earth Summit will focus on the changes that we must make to ensure global environmental and economic security. Preparations for the conference will define the concrete measures to effect these changes. Many of our current action pathways will thus converge on the road to Brazil and will continue after Brazil within the framework of the agenda for action to be adopted there for the twenty-first century.

Reprinted from *Development Forum*, April 1991.

UPDATE

LANDFILL GAS SURVEY

Results of HMIP's latest survey of landfill sites producing landfill gas were published in April. The results are based on information provided by waste disposal authorities in England and Wales following requests from HMIP in 1987, 1988 and 1989. The survey results show the scale of the problem and the action being taken to deal with it. The picture however is not complete, both because the returns from WDAs have proved inconsistent and incomplete and because WDAs are continuing to search for, monitor and control gassing sites. The results must therefore be viewed with this in mind.

The results provided a preliminary estimate of some 1390 sites — of which about half were thought to be within 250 metres of housing and industry — considered as being in need of controls. These results appeared in the first HMIP Annual Report. Refinement of this figure from the August 1988 letter identified 825 sites needing controls of which 69 per cent were in the public and 31 per cent in the private sector.

The 1989 survey revealed an increase of 22 per cent over 1988 in the numbers of sites considered to need controls — a ten per cent increase in the number of private sector sites to 41 per cent of total sites. The largest group of potential problem sites is still closed local authority sites (36 per cent or 363 sites). This is consistent with the involvement of local authorities in the disposal of household and commercial wastes throughout the previous 30 years. Closed sites in both sectors together accounted for 53 per cent of the total identified in 1988 but increased to 59 per cent in 1989.

HOSPITAL INCINERATORS

The implementation of the *Environmental Protection Act 1990* on 1 April also saw the removal of Crown Immunity from the NHS and health authorities. As a result they are now liable for prosecution if their clinical waste incinerators fail to meet standards laid down in the EPA.

Operators of hospital incinerators, which are to be regulated by local authorities under Part I of the EPA, must submit an application for an authorisation by September of this year; in the case of existing incinerators, the application will need to specify how it is intended to meet relevant standards.

Although local authorities may give operators up to five years to meet the new standards, it is likely that many hospitals will have difficulties in finding the cash to upgrade. They will therefore have to close down their incinerators and find an alternative means of disposing of their clinical waste.

UPGRADING WASTE FACILITIES

Environment Minister, David Trippier has announced that £60 million is to be made available over three years to upgrade and replace municipal incinerators. A further £31 million will be available over the same period to help

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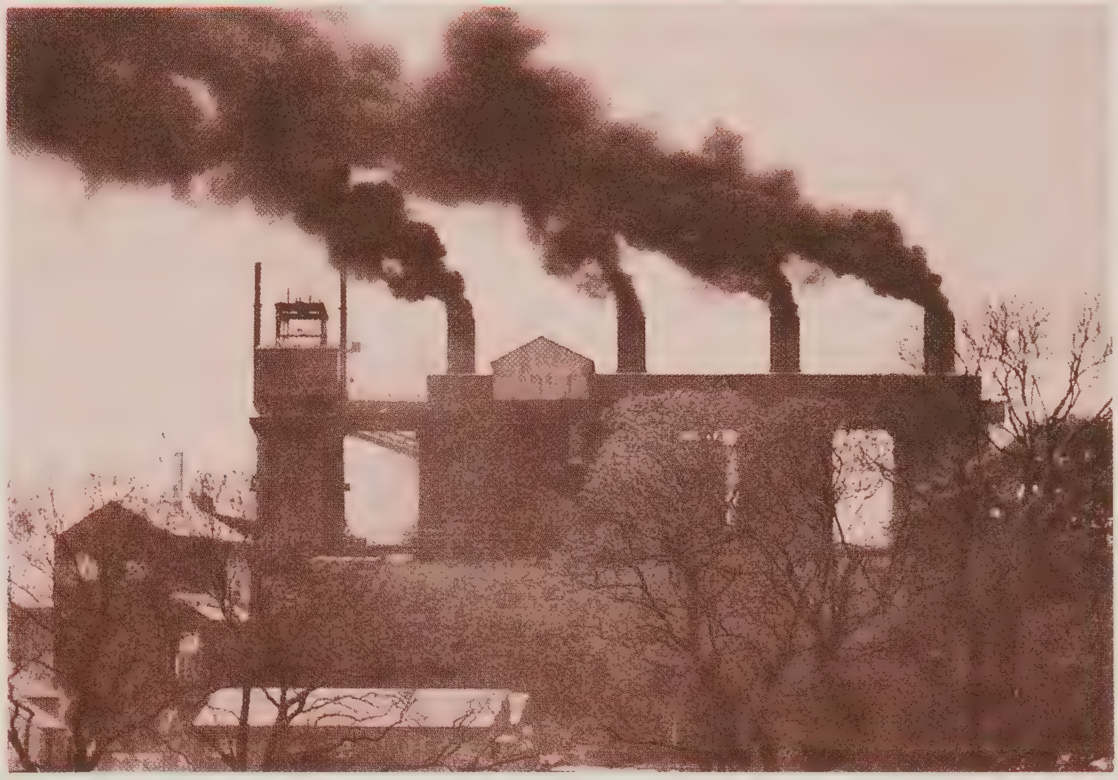

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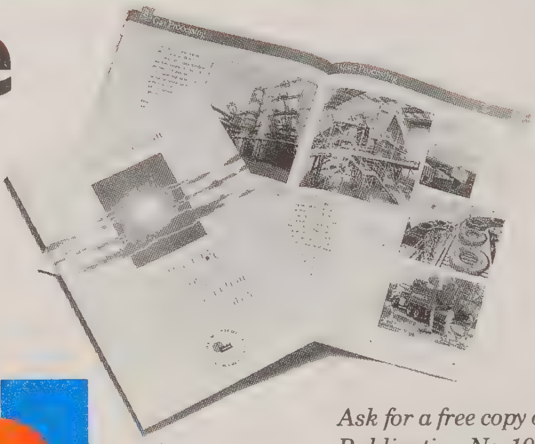

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authorities improve standards at landfill sites, transfer stations and civic amenity sites and £40 million of resources will be available to enable authorities to invest in effective recycling schemes. The derelict land programme for 1991-2 has been increased by £15 million. Research projects have been commissioned on recycling building waste and waste from quarries and mines; studies to monitor the results of pilot recycling projects in a number of cities have also been commissioned.

WASTE MANAGEMENT

The Department of the Environment has set up a new Waste Technical Division within the Directorate of Pollution Control and Wastes. Its main task will be to provide the professional expertise needed to implement the new waste management regime in the *Environmental Protection Act 1990.* The Division will also write and issue guidance in the Waste Management Paper series, represent the UK Government in international negotiations and supervise an extensive programme of research and consultancy.

CONTAMINATED LAND REGISTERS

The Department of Environment has published a consultation paper setting out its proposals for local authority registers of land which may be contaminated as a result of its past or present use. The paper identifies three key issues:

- Where are the sites which may be contaminated?
- What is the significance of any contamination?
- How do we deal with it?

Section 143 of the *Environmental Protection Act 1990* places a duty on local authorities to compile and maintain registers of land which may be contaminated, in accordance with regulations. The main purpose of registers will be to alert local authorities, landowners and potential purchasers or developers to the possibility of contamination, and to indicate the types of contamination to be expected. However, registers will also assist local authorities in carrying out many of their statutory functions, both in dealing with individual cases and in developing management strategies. The registers will be used by local authority planning and environmental health departments and other public bodies as well as by purchasers and vendors of land. The Government expects that searches of registers will become a normal part of property conveyancing procedures.

Other users of registers will include the National Rivers Authority and those involved in land transactions and valuations. Our guidance on registers will also cover ways in which the information they hold can be combined with other environmental information or planning systems.

DTI ENVIRONMENT GRANTS

The Environmental Technology Innovation Scheme (ETIS) launched in October 1990 is a joint DTI/DoE scheme. It is aimed in general at collaborative research projects, although support is also available to single companies for projects within a Priority Area and showing promise of allowing higher environmental standards.

The programme covers four broad areas of environmental technology:

★ cleaner technologies

★ recycling
★ waste or effluent treatment and disposal
★ environmental monitoring.

The above are not exclusive. Any innovative environmental technology project will be considered. Within the four broad areas, there are eight priority areas. These are:

Air:
★ thermal treatment of municipal waste;
★ odour control;
★ emissions to atmosphere of chlorofluorocarbons and halons;
★ emissions to atmosphere of volatile organic compounds.

Water:
★ reduction of heavy metals in industrial effluents;
★ reduction of organic compunds in industrial effluents.

Other:
★ treatment of organic contaminants in soils;
★ environmental impact of recycling.

The DTI's Environmental Management Options Scheme (DEMOS), also launched last October, aims to encourage the widespread adoption of best technologies or practices which offer wide environmental benefits.

There are four main types of project — those which:

★ exemplify best technology or practice already in operation;
★ install innovative environmental technology for demonstration;
★ show the practicability of a new example of environmental technology, equipment or scheme in working conditions, on a collaborative basis;
★ investigate environmental technology problems and solutions under a "club" arrangement.

DEMOS is concentrating on the following broad areas:

★ cleaner technologies;
★ recycling;
★ treatment and disposal of waste.

Both schemes offer a matchmaking service for companies seeking partners for collaborative projects and companies can register for this even if they do not yet have firm project proposals. For more details contact the Department of Trade and Industry, Environment Unit, 3rd Floor, 151 Buckingham Palace Road, London SW1W 9SS.

LSS IN PRAGUE

LSS, the scientific arm of the former Greater London Council and now part of the High-Point group is jointly sponsoring a three-day environmental seminar in Czechoslovakia with the Ministry of the Environment and the Czech Association of Civil Engineers.

The seminar on Restoring the Environment and Environmental Impact Assessment is intended to be the first in a series covering air pollution, water pollution, contaminated land, waste management and noise.

The first seminar, from 23-25 September, will focus on practical steps required to restore the environment to an acceptable level. It will also cover the role of environmental impact assessment in ensuring that the expected growth and development of new industry, commerce, transport and leisure facilities take environmental protection fully into account.

Further details are available from Prague Conference, Rendel Science and Environment (LSS), 30 Great Guildford Street, London SE1 0ES.

CLEAN COAL PROJECT

GEC ALSTHOM — the Anglo-French power generation equipment manufacturer — is to join British Coal's clean coal "Topping Cycle" project at Grimethorpe in Yorkshire.

The "Topping Cycle" is a combined cycle system — powering both steam and gas turbines — using fluidised-bed coal burning technology. It incorporates a secondary, coal gasification system to "top up" the exhaust gases which fire the gas turbine.

Successful development of the technology will mean electricity can be generated from coal at 45 per cent efficiency compared with the current 37 per cent for conventional plant — a 20 per cent increase. This would result in a 20 per cent reduction in the amount of carbon dioxide emitted to the atmosphere, a significant reduction in nitrous oxide emissions, and — because limestone is added to the fluidised bed — 90 per cent of the sulphur is removed at source.

The £27 million, three-year proving stage of the project is scheduled for completion at the end of 1992. The government's continuing support for the project is conditional on private sector involvement. The current partners in the "Topping Cycle" project are British Coal, PowerGen and the Department of Energy.

INDOOR AIR ASSOCIATION

Founded eighteen months ago by scientists from the United Kingdom, and other countries in Europe, Asia and North America, the International Association for Indoor Air Quality — Indoor Air International — is concerned with the problems of both indoor air contamination and other aspects of the indoor environment. It aims to provide a means of exchange for ideas and for presentation of research findings, with an emphasis on the encouragement of a multi-disciplinary approach to the wide variety of problems involved.

Members include scientists and practitioners from professions associated with occupational health, environmental health, public health, architecture, ventilation engineering, building maintenance and other disciplines associated with the quality of the indoor environment.

The development of the Association's activities includes the publication of a major, peer reviewed, international journal Indoor Environment. The first issue of which was due to be published in June 1991.

Indoor Air International's first President is Frank Lunau who has recently served as the Executive Secretary of both the British occupational Hygiene Society and the International Occupational Hygiene Association. For further information contact Mr F W Lunau, President Indoor Air International, 3 Albion Road, Kingston, KT2 7BZ. Tel: 081 942 6738.

INSTITUTE OF ENVIRONMENTAL ASSESSMENT

Since July 1988, many new types of infrastructure and commercial developments have required an analysis of their environmental impacts to be presented to Planning Authorities alongside the normal planning application. In July 1990, a new independent organisation called the Institute of Environmental Assessment was formed to raise the standards of environmental assessment.

The Institute is backed by many large companies and a number of UK environmental consultancies and planning authorities. The Institute is active in four main areas:

- Quality audits of Environmental Statements.
- Environmental Project specificiation for industry.
- Accreditation for Environmental Consultancies.
- Promotion of best practice.

Details of activities and membership can be obtained from Simon Day, Laytons (Solicitors), 16 Lincoln's Inn Fields, London WC2A 3ED; or from The Institute of Environmental Assessment, The Old Malthouse, Spring Gardens, London Road, Grantham, Lincs NG31 6JP. Telephone: 0476 68100.

(Extracted from Laytons Newsletter)

BOOKS AND REPORTS

PASSIVE SMOKING — A HEALTH HAZARD

Imperial Cancer Research Fund, Cancer Research Campaign, 1991. £3.95. ISBN 0901682063.

A report that draws on the current body of research on the effects of passive smoking to conclude that the evidence is now clear that it can cause heart disease and lung cancer, as well as aggravating existing bronchial conditions such as asthma. It examines current policies and future options pointing out that Britain lags behind Europe in controls.

DICTIONARY OF ENVIRONMENTAL SCIENCE AND TECHNOLOGY

Andrew Porteous. Open University Press, 1991. £12.99. ISBN 0335092306.

A useful book, bringing together a wide range of terms from ecology, chemistry, biology, engineering and politics with extensive definitions. In some areas, however, it is not sure whether it is a dictionary or a reference work — for example "climate" gives three pages of useful information on climate change, without actually defining the term, and there are also some strange inclusions — such as the sole inclusion of "gladioli" as a biological pollution monitor. However, it is always difficult to select the terms for inclusion in such a book, and the extensive and detailed explanations make it a valuable reference book.

AIR POLLUTION AND HUMAN CANCER

L. Tomatis (ed). Springer Verlag 1991. DM 78000. ISBN 3540529012.

An analysis of the evidence for the contribution of air pollution to human cancer. The study covers the sources and nature of air pollutants, measurement and monitoring, epidemiological and experimental evidence and cancer risk estimation and prevention.

AEROSOLS — SCIENCE, INDUSTRY, HEALTH AND THE ENVIRONMENT

S. Masuda (ed). Pergammon Press, 1990. £164.00. ISBN 0080375243.

Proceedings (in two volumes) of the 3rd International Aerosol Conference in Japan in 1990, which covers all aspects of aerosols and their effects on health and on the environment.

FIGHTING NOISE IN THE 1990s

OECD, 1991. HMSO. £12.00. ISBN 9264134573.

An analysis of recent trends in exposure to noise and the implementation of noise abatement policies. The study focuses on the situation in Australia, France, Germany, Japan, The Netherlands and Switzerland. It finds that the countries face similar problems and that the main sources of noise pollution are road and air traffic. The outlook for effective controls in these areas is poor as traffic levels continue to rise. Similarly, control policies on neighbourhood noise in the countries studied remain inadequate. It is concluded that coherent national strategies are needed to control noise, along with coordinated policies and resources and that noise implications should be considered in planning applications.

METEOROLOGY OF AIR POLLUTION — IMPLICATIONS FOR THE ENVIRONMENT AND ITS FUTURE

R.S. Scorer. Prentice-Hall, 1991. £22.50. ISBN 0135772303.

A well illustrated guide to the meteorological mechanisms which govern the dispersal of pollutants once they are emitted to air. The first half of the book looks at local effects, with the second half covering global and climatic phenomena.

AIR POLLUTION CONTROL — TRADITIONAL AND HAZARDOUS POLLUTANTS

E. Hesketh. Technomic 1991. Sf 165. ISBN 0877627630.

A handbook of air pollution control devices and systems covering basic principles, application data, practical design and operating issues for all types of air pollutants and control systems.

WRONG SIDE OF THE TRACKS? IMPACTS OF ROAD AND RAIL TRANSPORT ON THE ENVIRONMENT: A BASIS FOR DISCUSSION

TEST, 1991. £45.00.

A comprehensive review of the relative environmental impacts of road and rail transport. Current policy is examined along with the comparative impacts of road and rail on human safety and health, noise levels, air pollution, land use, ecology and resource consumption. The report concludes that, inspite of the increasing number of environmentally friendly claims from road builders and car manufacturers, the environmental impact of road transport is far greater than that of rail.

THE AUTOMOTIVE INDUSTRY — MANAGING A CLEANER ENVIRONMENT

Knibb, Gormenzano and Partners, 1991. £295.

This overview of the environmental impact of the automotive industry, draws together publicly available statistics and original research. It covers vehicle manufacturing, development and utilisation, fuel development and manufacturing, economic factors and current and future trends. Although it contains lots of useful data, its price will put it beyond the reach of many.

ENVIRONMENT, RESOURCES AND CONSERVATION

S. Owens, P.L. Owens. Cambridge University Press, 1991. £6.50. ISBN 9780521313780.

Aimed at A level and undergraduate geographers and environmental planners, the book uses case studies of acid rain, the British coal industry and the Norfolk Broads to investigate resource management, non renewable resources and pollution.

PREDICTION OF THE ENVIRONMENTAL FATE OF CHEMICALS

Y. Samiullah. Elsevier, 1991. £45.00. ISBN 1851664505.

An examination of the release of chemicals into the environment and the processes and pathways they take once they get there. The book covers modelling and the processes that take place in the soil, aquatic and atmospheric environments.

P FOR POLLUTION — YOUR GUIDE TO POLLUTION AND HOW TO STOP IT

Brian Price. Greenprint, 1991. £6.99. ISBN 1-85425-059-0.

This is a concise and clearly written introduction to pollution which sets out the facts about the pollution problems which face us today. The book is aimed at "ordinary people" and for those of us that somehow escaped learning any science at school, there is an extremely helpful chapter on basic science; chapter 2 shows how pollution travels through the environment and chapter 3 looks at the effects of pollution. Part 2 of the book comprises a comprehensive directory of pollution issues, pollutants and some of the methods of dealing with pollution. The final parts of the book include a brief history and summary of the legislation and authorities controlling pollution, useful organisations and a "what you can do" section. This book will be a helpful reference book for students and indeed anybody else either wanting to find out more about pollution or check facts.

A GREEN HISTORY OF THE WORLD

Clive Ponting. Sinclair Stevenson Ltd. £16.95. ISBN 1-85619-050-1.

For his latest book Clive Ponting has moved away from exposing those events and actions which governments this century have tried to keep secret and joined the growing number of authors jumping on the green bandwagon. In this book, he charts the history of civilisation from the earliest hunting and gathering groups, through the first human settlements to the present day. By showing us how civilisations developed — agriculture patterns and land use, energy use, the move away from a more nomadic way of life to permanent settlements — he shows how their activities may have had an adverse effect on their environments and in some cases contributed to their extinction. In fact, if one of the extinct groups were able to read this book, they would probably say that with the benefit of hindsight and science, they might have done things differently. Having said that, this is an extremely interesting, well researched book and perhaps the message to present day policy makers is that with the benefit of science, if not hindsight, we should take care that we don't go the way of earlier civilisations.

P IS FOR PESTICIDES

Dr. T. Lang, Dr. C. Clutterbuck. Ebury Press, 1991. £6.99. ISBN 0852239688.

The laypersons' guide which alerts us to the prevalence of pesticides in our food, water, textiles and air. The first part of the book gives a brief history of the development of pesticides and their uses, the companies that manufacture them and alternative and future options. The second part of the book looks at the pesticides commonly found in our foods and those most common in our environment and calls for "P" (pesticide) labelling of foods. With a glossary, reading list and references it provides a useful and sensible introduction to this often emotive subject.

CARING FOR ENVIRONMENTS

B. Knapp. Simon & Schuster, 1991. £8.99. Rivers and Lakes ISBN 07500 08423 Deserts ISBN 07500 08431.

Part of a series aimed at National Curriculum stage 2 pupils, these colourfully illustrated text books provide a stimulating introduction to environments, looking at their physical geography, human systems developed around them and past and future environmental problems. These books are well written and their lively approach should make them a popular choice with young environmentalists.

GRANTS FROM EUROPE

A. Davison, B. Seary. Bedford Square Press. 1990. £7.95. ISBN 0719913047.

Subtitled "How to Get Money and Influence Policy", this book provides an excellent introduction to the often impenetrable world of the European Community. It provides a step by step guide to the structure of the bureaucracy of the Commission. Lists of contacts are included, and advice on lobbying procedures. The latter chapters of the book deal with policy areas by subject, listing key people, policies and funds available.

DIGEST OF ENVIRONMENTAL PROTECTION AND WATER STATISTICS, NO. 13 1990

Department of the Environment. £13.50. ISBN 0 11 752415 8. HMSO.

Annual Digest covering trends in environmental protection and water quality in the following areas: air quality and global atmospheric change; water quality; radioactivity; noise; waste and recycling; land and nature conservation; water supply and use. In most instances, data up to December 1989 is included.

BRITISH POLITICS AND THE ENVIRONMENT

John McCormick. WWF Earthscan, 1991. £7.95. ISBN 9781853830907.

Inspite of Britain creating the world's first government environmental agency — the Alkali Inspectorate in 1863 — and the world's first cabinet level environment department in 1970, it was not until 1988 that the environment really hit the political agenda of the major parties in Britain. This analysis of the history and the current state of the environment as a political issue in Britain examines the lobbys and the policies that have shaped British environmental politics.

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FUTURE EVENTS

30 JUNE — CEMP 6TH INTENSIVE TRAINING COURSE ON ENVIRONMENTAL ASSESSMENT AND MANAGEMENT

Three month course providing participants with a broad understanding of the main principles of environmental assessment and management and developing a practical knowledge of its utility as a decision-making tool. Fee: £4,840 + VAT (excluding accommodation).

Details: Centre for Environmental Management and Planning, 23 Machar Drive, Old Aberdeen. Tel: 0224 272483. Fax: 0224 487658.

2-5 JULY — LAND RECLAMATION '91 — THIRD INTERNATIONAL CONFERENCE

The conference will examine the demand from society to regenerate the environment in areas where the land has been reduced to dereliction through industrial and other uses. Land reclamation will be considered in four areas: Planning, Land Use and Management; Engineering Techniques, Contaminated Land and Biotechnology. Fee: £287.50.

Venue: University of Wales, College of Cardiff.

Details: Kay Russell/Gill Spear, Elsevier seminars. Tel: 0865 512242. Fax: 0865 310981.

6-11 JULY — SUNDAY TIMES ENVIRONMENT, WILDLIFE AND CONSERVATION EXHIBITION

The principal objective of the conference is to act as forum for new ideas and approaches to the threats facing wildlife and the environment. It hopes to appeal to experts and non-experts alike. There will be workshops complimenting the main conference.

Venue: Grand Hall, Olympia, London.

Details: World Trade Promotions Ltd. Tel: 081 642 7688. Fax: 081 642 1313.

8 JULY — THE ENVIRONMENT AND ENERGY ISSUES

The conference will look at the European Bank for Reconstruction and Development's role in restoring eastern Europe's environment, with emphasis on its activities in the energy sector at public/private level. It will provide an important opportunity at the early stage of the EBRD's life to learn how the institution will operate, what sort of projects are likely to be funded and how its activities will relate to developments in the European Community's energy and environment policy. Fee: £275 + VAT.

Venue: The Conference Forum, Sedgewick Centre, London E1.

Details: Alison Jones/Elaine Hendry, Legal Studies and Services Ltd. Tel: 071 236 4080. Fax: 071 583 7101.

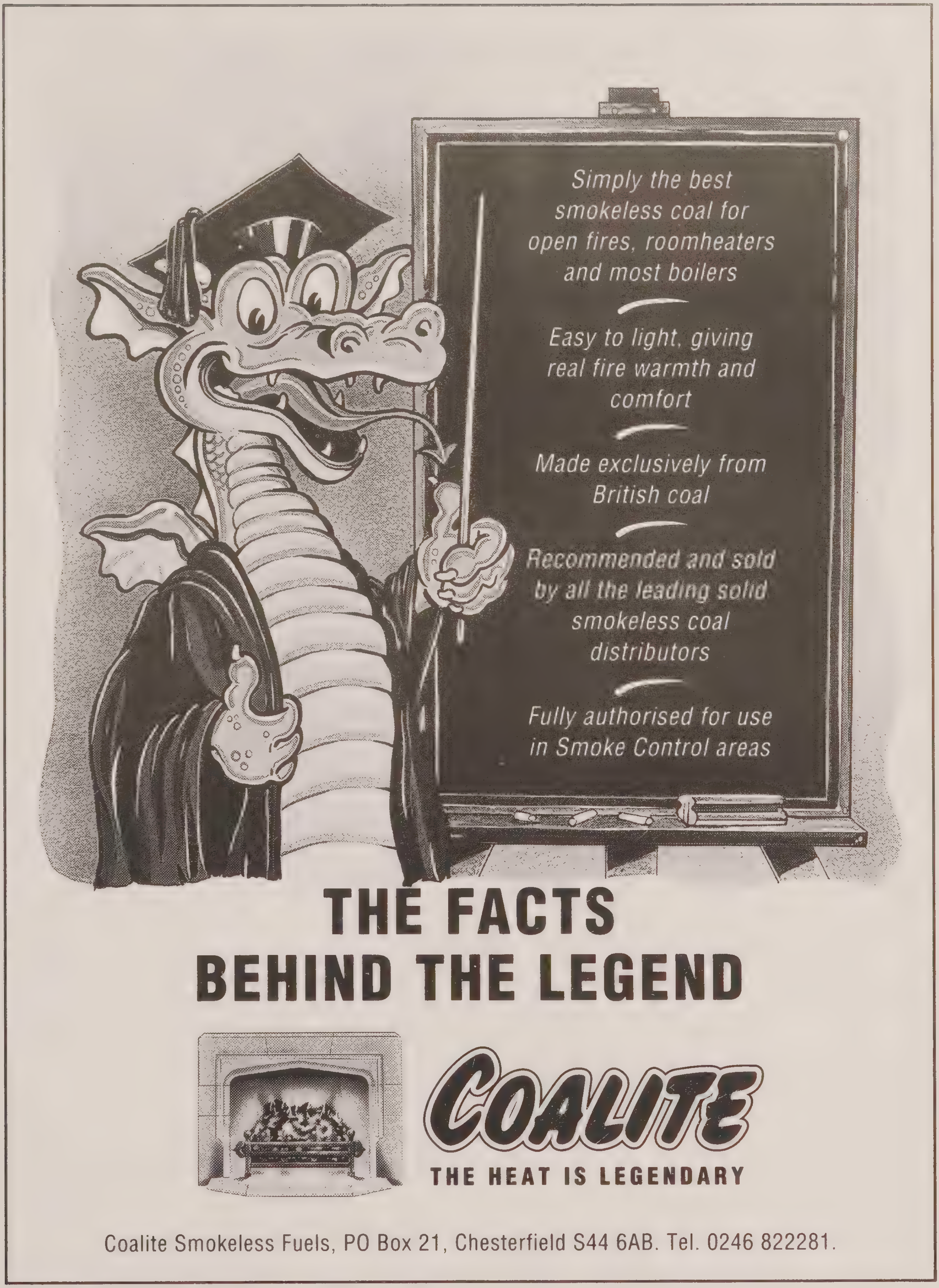
10 JULY — EUROPEAN COMMUNITY ENVIRONMENTAL LEGISLATION
As industry in the UK comes to terms with the impact of the *Environmental Protection Act* and the implementation of integrated pollution control, the flow of new proposals from Europe continues unabated. The conference, organised in association with the UK Environmental Law Association, will briefly explain the EC legislative process, survey the key emerging legislation and policy, and analyse its practical impact on British business. Fee: £265 + VAT.
Venue: The Bloomsbury Crest Hotel, Coram Street, London WC1.
Details: Alison Jones/Elaine Hendry, Legal Studies and Services Ltd.
Tel: 071 236 4080. Fax: 071 583 7107.

12-15 JULY — THE CENTRE FOR INTERNATIONAL ENVIRONMENTAL LAW SUMMER SCHOOL
The course will cover UK, EEC and International Law. It is suitable for representatives from corporations, local authorities and public interest groups as well as practising and academic lawyers. Fees: £200 + VAT (one day); £750 + VAT (full course).
Venue: Kings College, London.
Details: CIEL. Tel: 071 352 8123. Fax: 071 351 6435.

5 SEPTEMBER — LOCAL ENVIRONMENTAL MONITORING: DEVELOPMENTS IN COST EFFECTIVE TECHNIQUES
One day training workshop, organised by the NSCA; topics to be covered include: establishing monitoring priorities; urban air quality management; modelling traffic pollution; high-tech approaches to monitoring ambient benzene; gamma radiation monitoring for local authorities; assessing dust nuisance; and long range optical path systems.
Venue: National Exhibition Centre, Birmingham.
Details: Peter Mitchell, NSCA. Tel: 0273 26313. Fax: 0273 735802.

9-13 SEPTEMBER — IEHO ANNUAL CONGRESS AND EXHIBITION
The conference is combined with the second International Congress of the International Federation of Environmental Health. Issues covered will include environmental policies and practice, food and water and occupational health and safety.
Fee: £270.25 (five days); £70.50 (one day).
Venue: Brighton Conference Centre, East Sussex.
Details: Conference and Exhibition Dept, IEHO, Chadwick House,
Rushworth Street, SE1.

24 SEPTEMBER — EUROPEAN WASTE POLICY: MAKING IT WORK
Annual Conference of National Association of Waste Disposal Contractors. The conference will address the major aims of the European Commission's waste management strategy and how it will be implemented in the UK in practice. Fee: £200 + VAT for members; £250 + VAT non-members.
Venue: Queen Elizabeth II Conference Centre, London SW1.
Details: Claire Foxley, Event Planners, 26 Batoum Gardens, London W6 7QB.



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NATIONAL SOCIETY FOR CLEAN AIR
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VOL. 21 NO. 3
AUTUMN 1991

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NATIONAL SOCIETY FOR CLEAN AIR AND ENVIRONMENTAL PROTECTION

(Founded 1899)

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28 Maes-y-celyn, Griffithstown, Pontypool, Gwent

EDITORIAL

WARNING BELLS FOR LOCAL POLLUTION CONTROL

As promised, Michael Heseltine has reviewed the Government's environmental action programme one year after the publication of "This Common Inheritance". The publication of his report is a welcome step, and one which could usefully continue on an annual basis. Since this Government, following the pattern of its predecessors, virtually ignored the environment during the 1980s, much of the activity in the last year represents a catching-up on issues which environmental groups have been lobbying for over the last decade. Compressed into one year it looks impressive, and there are some genuinely welcome initiatives — several of which NSCA had campaigned for — which we applaud. However too many policies which are presented as successes are in truth missed opportunities — good ideas spoilt for a ha'p'orth of tar. MOT emission testing has been introduced, but with inadequate standards. Air quality bulletins are now issued, but with inappropriate terminology. The extension of air pollution monitoring is welcome, but the expansion programme (two new sites a year) is disappointingly slow. The Chancellor's March Budget barely tinkered with green taxes and incentives.

More seriously, the claim to have "played a leading role in international negotiations towards a framework convention" on global warming is a travesty; the UK has in fact supported US foot-dragging on a climate change convention. The EC is keen to reduce CO_2 emissions, whilst the Americans plan to go on increasing them. The Secretary of State has tried and failed to build common agreement between the US and Europe on CO_2 reductions. Unless it shows a greater capacity for global responsibility, the US runs the risk of becoming ostracised and if Britain continues to side with the US we will be under considerable pressure from our European partners to step into line.

Finally, the decision to create an environmental protection agency has backfired in an embarrassing way because the proposals were not properly thought through. Following the political uproar caused by the Prime Minister's announcement in July, the new consultation paper on proposals for an EPA in England and Wales ensure that any action will be postponed until after the general election. However parallel plans for

Scotland are still in train. The Scottish Office proposes to remove all local authority responsibility for air pollution and waste regulation to an EPA alongside the Scottish Pollution Inspectorate and River Purification Boards. Given the Government's predilection for testing controversial policies north of the border, these proposals should ring warning bells for everyone concerned with local pollution control.

NSCA has always advocated an over-arching independent agency which can produce a coordinated approach to environmental policy, leaving those "sharp end" agencies responsible for pollution control enforcement to get on with the job. There is nothing to be gained by breaking up the National Rivers Authority and further shaking up the pollution inspectorate. Removing local authority responsibilities for environmental protection would entail the loss of local accountability and democratic control. Alongside most other environmental and industry groups, NSCA has long called for an EPA to be established. The Government must now reflect on the reasons why, having promised such an agency, those same groups are rejecting the main thrust of its proposals with one voice.

NSCA SOUTH-EAST DIVISION SEMINAR

ENVIRONMENTAL IMPACT OF TRANSPORT IN THE SOUTH-EAST

Keynote Address - Patrick McLoughlin MP
Under-Secretary of State for Transport

Routes for the Future - Protecting the Environment
Environmental Effects of Road Traffic
Transport Noise
The Growth of Aviation in the South-East
Environmentalmpact of the Channel Tunnel
Rail Transport and the Environment
Tramlink Networks - a New Alternative
Transport - Planning for the Future

Kennedy Lecture Theatre - Institute of Child Health
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TUESDAY 26 NOVEMBER 1991

For a copy of the Seminar Brochure contact NSCA on 0273 26313

NSCA NEWS AND VIEWS

LOCAL ENVIRONMENTAL MONITORING

NSCA's one-day monitoring training seminar, held in the hi-tech surroundings of Birmingham's National Exhibition Centre on 5 September, attracted a sellout audience of over one hundred from as far afield as Exeter and Belfast. The proceedings were introduced by Cllr Ray Turner, Chairman of the NSCA's West Midlands Division and chaired by Trevor Townsend and Rob Key, also from our West Midlands Division.

Jon Bower of Warren Spring Laboratory reviewed the reasons for local monitoring and the variety of techniques available. He suggested that many of the claims made by monitoring equipment suppliers should be treated with caution and anyone interested in monitoring should beg or borrow trial equipment and try it out in the field. Roger Barrowcliffe of Environmental Resources Ltd. followed with a summary of urban air quality assessment and control methods, based on a report prepared for the DOE Air Quality Division. Dr. Keith Simms of Consultants in Environmental Science then showed how air pollution modelling could fill in some of the information "holes" left between monitoring results, and some of the practical limitations. During lunch delegates toured exhibition stands where a number of environmental monitoring companies were represented, and saw some air pollution and ground sampling equipment in action outside the seminar complex.

Steve Read of Enviro Technology started the afternoon session by introducing Geoprobe — a new technique for sampling gas, water and soil from contaminated land. Andrew Tyler of the Scottish Universities Research and Reactor Centre then illustrated his work undertaking aerial surveys of gamma radiation. Helicopter surveying allows the mapping of large areas to establish background radioactivity against which discharges from nuclear plant or other radiation sources can subsequently be detected. Back at ground level, Hazel Doyle of Rendel Science and Environment described a method of nuisance dust sampling based on the reduction of gloss on glass slides. The results accorded well with public perceptions of dust nuisance and had been used as evidence in public enquiries and nuisance actions in magistrates courts. Finally Dr. Roger Partridge of the National Physical Laboratory described developments in optical long-path sensors which can monitor a range of gases over long distances and determine gas fluxes. Giving examples which included measurement of sulphur dioxide from an oil refinery and methane from a field of cows, he announced that a portable optical system developed by NPL was being commercialised and would be on the market within a few months.

Closing the day's events, Len Medlycott of the NSCA West Midlands Division and Alan Rees, Chairman of Council thanked the speakers, chairmen and organisers for their contributions to what had proved to be a wide-ranging and very informative seminar.

SCOTTISH DIVISION

The Scottish Division, in conjunction with the Royal Environmental Health Institute of Scotland, held a one day Seminar in Perth, on the *Environmental Protection Act,* Parts I and II. The Seminar was attended by 180 delegates, 8 speakers and 8 invited guests.

The first speaker at the morning session which dealt with Part I of the Act, was John Convery from the Scottish Office, Environmental Department. He gave an overview of its requirements and discussed the *Applications, Appeals and Registers Regulations* and the *Prescribed Processes and Substances Regulations.* William Watson from HM Industrial Pollution Inspectorate discussed the requirements of BATNEEC (Best Available Techniques Not Entailing Excessive Costs). He said that HMIPI will be transferring approximately 200 processes to local authorities, mainly from the mineral works category, and, in order to make the transition as smooth as possible, HMIPI inspectors will hope to make joint visits to premises with local authority staff.

Calum MacDonald of Glasgow District Council and NSCA, drew attention to the need for adequate training of enforcement staff if the Act is to be effectively implemented and the need for local authorities to be provided with the necessary resources. In this connection there are to be three further workshops, run by NSCA/REHIS, for EHOs and enforcement staff.

The fourth speaker — Peter Young of Aspinwall & Company — reviewed the challenge that the Act represents in the field of air pollution and the role consultants can play in meeting that challenge. Since the Act has already been in force in England and Wales since April 1991, he was also able to provide 3 case studies for discussion. The final morning session speaker was Alexander Peckham from the Centre for Environment & Business in Scotland (CEBIS). He detailed the work being carried out by his organisation and explained how CEBIS is actively raising the awareness of how the Act is going to affect companies and offering advice and assistance.

The afternoon session dealt with Part II of the Act, with the first speaker, Malcolm Crawford from the Scottish Office, Environment Department, outlining the main provisions of Part II which relates to waste. He explained that the provisions of this part of the Act were being brought into force in stages. He said that fees are to be levied for the issue of Waste Management Licences to cover the cost of Waste Regulation and that local authorities will be required to pay local River Purification Boards a sum to cover their involvement in waste regulation activities.

He was followed by John Crawford, Director of Environmental Health for Hamilton District Council and REHIS. He asked the question “Part II of the Environmental Protection Act — Can It Be Made To Work?” He believed that there should be effective separation of the waste regulatory and waste disposal functions at a high level and argued that the Fit and Proper Person requirements will “not bite hard enough”. He was critical of the duty of care proposals and felt that more onerous requirements should be placed on industry. The largest omission from the Act was a requirement that local authorities become self sufficient in waste disposal.

The final speaker of the day was Derek Greedy from Shanks & McEwan (Waste Services) Ltd. He discussed the effect the *Environmental Protection Act* will have on landfill with particular reference to the duty of care, publicity, waste management licences, re-organisation of local authorities and functions of the Secretary of State. He believed that the introduction of the Act would strengthen the former legislation and go some way to providing public confidence in the waste disposal industry.

EAST MIDLANDS DIVISION

Despite a recent dearth of Divisional Reports (for which the Secretary can only offer the feeble excuse of other commitments), the East Midlands Division is still very much alive and active. Our 1991 programme commenced in January with a Seminar, organised jointly with the Derbyshire Pollution Advisory Council, on Part I of the *Environmental Protection Act.* This was held in Chesterfield and took the form of a series of technical presentations on the application of Part I of the Act to certain 'Block I' Industrial Processes. Our assessment of market needs must have been accurate because the event was a 'sell out' and favourable reports were subsequently received from delegates. The Seminar was ably Chaired by Councillor Caulfield of Chesterfield Borough Council and the Division is indebted to him and to the Derbyshire Pollution Advisory Council for the organisation that they put into the event.

The Division's Annual General Meeting was held this year on 20 June in Corby, the home of the retiring Chairman Councillor R.F. Ogilvie. Corby District Council were our hosts at the AGM and, as well as making available their Council Chamber as the venue for our meeting, demonstrated their usual high level of hospitality to the Society by providing us with a superb buffet lunch. The afternoon session of the AGM comprised technical presentations by Mr. Selwyn of Lucas CEL Instruments and Mr. Jones of GKN Occupational Health.

It has been possible this year to arrange two Autumn meetings for the Division. The first of these, which took place on 12 September, was to the Bass Brewery at Burton on Trent. This visit, was as might be expected, well attended and Bass took the opportunity, in a series of well planned presentations, to explain the steps which they are taking to minimise the environmental impact of their activities at Burton. This information and the product was well received by delegates, one of whom subsequently suggested to the Chairman that if the Society were considering changing its name then the letters C.A. should stand for 'Clear Ale'! The success of this visit is a source of personal satisfaction to the Secretary who, despite occasional assertions to the contrary, has always maintained that he was capable of organising such an event.

The Division's final meeting this year is on 10 October at the British Geological Survey (BGS) at Keyworth near Nottingham. BGS have considerable expertise in the highly topical fields of Radon and Contaminated Land and there will be presentations on these subjects and a tour of BGS facilities. It is understood that BGS would be willing to provide speakers for meetings of other Divisions of the Society.

The East Midlands Division has a full programme of meetings planned for 1992 and these will be reported in a subsequent issue of *Clean Air.*

NSCA SCHOOLS LEAFLET COMPETITION

The National Society for Clean Air is inviting schools to enter a competition to design a special leaflet on the environment. There will be prizes for winners in each region of the UK, and the two winning leaflets will be printed in tens of thousands for national distribution as "official" NSCA leaflets.

NSCA receives thousands of environmental enquiries from schoolchildren every year. We are looking for two new leaflets — one for junior schools, one for secondary — which we can send out to children all over the country. The subject is **"Ten things you can do for the environment".**

The aim of the competition is to excite children's interest and stimulate involvement in environmental issues; designed by children, for children of their own age. The competition will provide a useful focus for classwork, encouraging children to discuss environmental issues, evaluate priorities, and to cooperate on writing and design work.

The competition begins in Autumn 1991, with a closing date of March 31st 1992; regional judging in April and final national prizes in May 1992. The leaflets will be judged on a combination of attractive design and appropriate text.

Further details from:

National Society for Clean Air
136 North Street
Brighton BN1 1RG

FUTURE NSCA CONFERENCE DATES AND VENUES

ENVIRONMENTAL PROTECTION 1992
BOURNEMOUTH 19 - 22 October

ENVIRONMENTAL PROTECTION 1993
BRIGHTON 4 - 7 October

ENVIRONMENTAL PROTECTION 1994
BLACKPOOL 24 -27 October

ENVIRONMENTAL PROTECTION 1995
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AUDIT OFFICE REPORT ON HMIP

The National Audit Office report on HM Inspectorate of Pollution was finally published in August 1991. The study, commenced in late 1989, looked at the functions of HMIP in three main areas:

(a) the objectives set for HMIP's work and the criteria established for assessing how far it is meeting these objectives;

(b) the action taken to pursue and achieve objectives, and to deal with any difficulties;

(c) the steps taken to prepare for integrated pollution control.

The Report notes that since the Inspectorate was formed in 1987 it has made a good deal of progress in bringing together the work of the previous separate inspectorates. A number of weaknesses and variations in performance and practices have been identified and work is in hand to develop and implement improved systems and procedures as part of the preparation for integrated pollution control. The report recognises what has been done and the significant initiatives set in hand, but notes there is still some way to go and that continued vigorous efforts will be required to secure the full benefit from these initiatives.

In particular, the report confirms that both targets for, and actual, pollution inspections have fallen dramatically since 1987 — thus vindicating NSCA's continuing campaign for more staff and resources for HMIP. The continued failure to produce BPM technical guidance notes was "due to shortfalls of professional manpower" according to the report. "Until recently the Inspectorate has been below complement for professional staff, but recruitment has now improved. Although the (staff) complement has been progressively increased, further substantial increases are acknowledged to be required to deal with the additional demands being placed on the Inspectorate."

However it is by no means certain that HMIP are now up to their approved complement of 248 — the latest confirmed figures (April) are 232, whilst HMIP's internal forecast indicates a requirement of 416 staff now, rising to 458 in 1994. So the Inspectorate will continue to be understaffed: "This latest estimate of the Inspectorate's staffing requirements considerably exceeds the approved April 1992 complement of 313" says the report.

NSCA View

The NAO report confirms NSCA's view that HMIP continues to be under-resourced. HMIP currently has around 240 staff, but will need over 400 on most assessments. Staff levels are now rising but are still inadequate in view of the increasing demands of the new legislation, which has resulted in more bureaucracy at the expense of on-the-ground enforcement. An increasing proportion of site inspections is reactive rather than routine, whilst HMIP has virtually stopped in-house sampling and monitoring activities and now relies on outside contractors or self-monitoring by industry.

The Report represents a low point in HMIP's history, following a period during which the parent Inspectorates were transferred between Departments, merged, renamed, and generally under resourced, leading to low morale and resignations. The Report indicates that new management procedures are now in place, which should lead to more effective practices as the Inspectorate settles into its new role and structure under new leadership. However, the latest announcement that it is to be transferred yet again, this time to the new Environmental Protection Agency, poses the question whether the nation's interests will be better served by imposing on it a further period of destabilisation, or whether it should be granted a breathing space whilst it catches up with outstanding paperwork, recruits a full team, and comes to grip with the new legislation.

Like most environment and industry groups, NSCA is in favour of an EPA. However, the true role for such a body is to co-ordinate environmental policy and regulate activities across the board, including for instance transport, energy, agriculture and health. To be effective, such an Agency should become truly independent. Following the Prime Minister's recent announcement, plans for an Environmental Protection Agency await the publication of a consultation paper. Whilst we welcome the promise of more political independence for pollution regulation, the current proposals to merge the NRA and HMIP so far outlined fall well short of effective integration. In view of the Memorandum of Understanding between the NRA and HMIP, there would appear to be little if anything to be gained by such a move — particularly if this involves breaking up the NRA's integrated approach to water pollution. Moreover, many bodies — including local authorities and other Departments — have responsibility for pollution control.

It is difficult, therefore, to quantify the benefits which would derive simply from amalgamating the disparate functions of the present agencies into a single industrial environmental "police force." NSCA's long term objective is the establishment of an environmental protection agency with over-arching responsibility for pollution control. Until such a structure is in place, HMIP should be left to get on with the job it has been given, and given the staff and resources it needs to do that job.

CAR ALARMS

The Department of Transport is consulting on new regulations to limit noise nuisance from car alarms. In its response, NSCA criticised the proposals for not going far enough.

The proposed new regulations will introduce a 30 second cut-out period for the sounding of alarms, which NSCA acknowledges will be a substantial improvement on the 5 minute period currently allowed. However the proposals only apply to alarms fitted to vehicles first used after 1 August 1992. NSCA has urged that regulations should specify a date by which existing alarms should be upgraded to comply with the new specifications; otherwise there is the certain prospect of continuing nuisance from existing cars for at least a decade to come.

NSCA also stressed that if the proposed regulations are to be successful in controlling noise from audible alarms, it is important that they are adequately enforced by the police. The *Environmental Protection Act* places very specific requirements on local authorities to respond to complaints from the public about noise nuisance. Under the same Act local authorities may also take action against noise nuisance from car alarms where vehicles are parked on private land, i.e. off the highway. We would welcome a commitment from the Association of Chief Police Officers that complaints about car alarms will be dealt with effectively. NSCA suggests that local authorities who receive the bulk of initial complaints about car alarms may wish to improve liaison with police departments and to follow up complaints in order to monitor the number of satisfactory outcomes.

MOTOR RACING NOISE

NSCA is supporting investigations being carried out by environmental health officers at Rochdale, Tameside and High Peak Councils into the problems of implementation and enforcement of silencer policies at motor sport events.

During the last couple of years staff from Rochdale and Tameside environmental health departments have been actively encouraging the British Stock Car Association (BriSCA), one of the larger organisations which operate short oval motor racing, to pursue a responsible attitude to the silencing of vehicles competing in their Formula 1 category.

In February 1991 the Formula 1 Board of Control for BriSCA sought their further advice on a decision to adopt and enforce a silencer policy based upon a specific noise level of 103dB(A) at a distance of 2m from the centre line of the car, perpendicular to it, and at a height of 1.2m with the engine running at three-quarters of maximum revolutions. This is based on a standard used by the RAC to enforce maximum levels at motor sport events under their control.

Having accepted their advice the Board of Control then sought help in the enforcement of the new ruling and asked if the EHOs would be prepared to act as Official Noise Inspectors for them. The Formula 1 Board of Control are allowing the EHOs free access to all tracks under their control.

The vehicles operating under this formula are of unlimited engine size, capacities of 8 litres or more being common, and many variations of power train are in use. The problems of silencing such a wide range of engines will, it is hoped allow well founded advice to be offered to other organisations and local authorities and of course the formulation of a Code of Practice for the NSCA. Since the work was begun, the EHOs have been invited to comment on the silencing of other formulae such as Ministox which are based on standard mini road cars, and other open wheeled formula such as BriSCA Formula 2 (1300cc/2000cc) and Holstox (3500cc) further enhancing their knowledge of the problem of silencing engines. Other sources of noise such as public address systems, noise from pit areas and noise from spectators, are also being investigated.

1991 ROYAL MEDAL

NSCA's President, Sir John Mason, formerly Professor of Cloud Physics at Imperial College, London and Director-General of the UK Meteorological Office from 1965-83, has been awarded a Royal Medal by HM The Queen on the recommendation of the Council of the Royal Society. Three medals are awarded each year to scientists of the Commonwealth, for outstanding contributions in the physical, biological and applied sciences.

Sir John's medal is awarded for his pioneering contributions over 40 years to cloud physics, his scientific leadership of the Meteorological Office, and his prominent role in the planning and direction of major international scientific projects.

The only other meteorologist to have been awarded a Royal Medal since their inception in 1825 was Sir David Brunt, Professor of Meteorology at Imperial College from 1934-1952. Sir David appointed Sir John to his first post and encouraged him to pursue an independent research career in a new field.

IUAPPA

NSCA's Editor, Loveday Murley, represented NSCA at a meeting of the Executive Committee of the International Union of Air Pollution Prevention Associations held in Seoul, Korea in early September. NSCA is a founder member of IUAPPA which was founded in 1964 and also provides its secretariat with John Langston holding the position of Director General.

New Name

Like NSCA, the interests and work of a number of IUAPPA members — and indeed potential members — range far wider than the control of air pollution and there was therefore considerable support for IUAPPA president Steve Hart's proposal that IUAPPA's name should reflect its wider interests. It was felt that the main emphasis of IUAPPA's work should remain the *prevention* of air pollution but that this should embrace the prevention of other forms of environmental pollution which have implications for air pollution, such as waste management and minimisation.

A further consideration in any name change was to maintain IUAPPA's identity in much the same way that NSCA while adding "Environmental Protection" to its name has retained its logo and acronym as NSCA. Subject to the final agreement of the boards of individual members of the Executive, it was decided to recommend to the International Board of IUAPPA which meets next year in Montreal, that the words "Environmental Protection" should be incorporated into IUAPPA's name.

Declaration to UNCED

In line with IUAPPA's view that effective pollution control must start from the premise of pollution prevention, IUAPPA members agreed a Declaration, reproduced in this issue of *Clean Air,* as its input to the UN Conference on Environment and Development taking place in Brazil next year.

IUAPPA members are also being asked to bring the Declaration to the attention of their national governments. NSCA has already submitted a draft version of the Declaration to the UK Government.

IUAPPA World Congress

The 9th World Congress of IUAPPA is to be held in Montreal from 31 August-4 September 1992. The overall theme of the Congress is "Towards the year 2000 — Critical Issues in the Global Environment". The Congress brings together a wide range of pollution control professionals from throughout the world and the programme committee are planning for the presentation of approximately 450 papers spread over 54 sessions. Disappointingly, there were only nine proposals for papers from the UK, all of which have been accepted. Issues to be addressed include

- *Global issues* — atmospheric ozone, acid rain, greenhouse effect.
- *International Priority Substances Issues* — dioxins, benzene, PCBs, PAHs, radon etc.
- *Air Pollution Issues* — such as, indoor air, air toxics, fine particulates, visibility, noise, motor vehicles, control systems, measurement, modelling.
- *Waste Issues* — hazardous, management, minimisation, disposal alternatives, ocean dumping.
- *Management Issues* — risk management, regulation, policy, sociological implications.

The final programme is expected to be available in November. Further details are available from the Air and Waste Management Association, PO Box 2861, Pittsburgh, PA 15230, USA. Fax + 1 412 232 3450.

Clean Air Around the World

The second edition of IUAPPA's book *Clean Air Around the World: National and International Approaches to Air Pollution Control* is to be published in October. Edited by Loveday Murley (who is also IUAPPA's Editor), it includes chapters from 27 countries representing a wide range of both developing and industrialised nations. The importance of the need to look for international agreement to solve many of today's environmental problems is reflected through the inclusion of a chapter written by Peter Sand, Principal Legal Officer at UNCED who describes international laws and agreements on air pollution control. Within the European Community, the increasing role of European Directives on national policies is described in a chapter by Jean-Guy Bartaire of DG XI. Most of the country chapters have been written by IUAPPA members or by their Environment Ministries.

Further details of the book, price £32 including postage and packing, are available from the NSCA.

Regional Conference

The Executive Committee meeting was held in conjunction with IUAPPA's second regional conference which was organised by the Korea Air Pollution Prevention Association under the theme of Emerging Issues in Asia.

The conference attracted over 400 delegates from 22 countries, with the majority coming from Asia. The main themes covered were urban air pollution, cross-boundary transport of air pollution and aspects of air pollution such as meteorology, modelling and indoor air pollution. The programmes of IUAPPA regional conferences are drawn up with the specific needs of the region a priority and aim to encourage greater cooperation and interaction between all those in the region working on pollution issues.

DECLARATION

THE INTERNATIONAL UNION OF
AIR POLLUTION PREVENTION ASSOCIATIONS

A non-governmental, non-political organisation, consisting of professional and voluntary associations worldwide, whose national governments are assembling at the United Nations Conference on Environment and Development,

Respectfully submits to the United Nations and to all the governments of the world, for earnest consideration, the following declaration:

THE UNION

— **Considering** the full scope of the observations and recommendations for "sustainable development" contained in the 1987 World Commission on Environment and Development report, titled "Our Common Future," to the United Nations General Assembly, including those focusing on the rate of human population growth in the world,

— **Considering** further the need for economic growth and agricultural production to feed this population, inevitably leading to more pollution,

— **Cognizant** of the great strides in environmental protection made over the last twenty years,

— **Concerned** that technology is reaching the limits of traditional methods of pollution treatment and control,

— **Sensitive** to the dilemma that the significant resources spent on pollution control are not available for improving productivity or implementing alternative pollution control measures,

— **Recognising** that pollution control systems may result in pollutants being transferred from one medium to another,

— **Concerned** with the risks and potential social and environmental costs inherent in any release of pollutants into the environment,

— **Aware** that the public desires an environment where risks are minimised,

— **Determined** to promote the enhancement and maintenance of environmental quality, not only locally, but worldwide,

Submits, for the purpose of this declaration, that:

Pollution Prevention

- **Constitutes** a cornerstone of sustainable development,
- **Reduces** the risk inherent in the management of some waste streams and residues that result from traditional control methods, including the risk of technology failure,
- **Avoids** the inadvertent transfer of pollutants across media that may occur with some end-of-the-pipe media-specific treatment and control approaches,
- **Addresses** certain environmental problems of extraordinary urgency, such as the perturbation of the earth's radiation balance with consequences for global climate changes,
- **Applies** to a broad array of activities that lead to pollution, including energy use, agriculture, transportation, as well as industrial activity,
- **Protects** natural resources for future generations, by avoiding excessive levels of wastes and residues, minimising the depletion of resources, and maintaining the capacity of the environment to absorb pollutants,
- **Provides** a cost-effective method of environmental protection that can reduce raw material and energy losses, reduce the need for expensive "end-of-pipe" treatment technologies, encourage improvements in process efficiency and performance, and reduce long-term liability,
- **Reduces** the use of hazardous and toxic substances in manufacturing and other processes,
- Is feasible, practicable, and available.

Defines, for the purpose of this declaration, the following concepts:

- **life cycle** "cradle to grave" management includes raw materials extraction and use, energy conversion, impacts, transportation, worker safety, waste management, treatment and disposal, and potential liabilities, releases into the environment, as well as product use and ultimate disposal,
- support for better **design** of industrial processes includes research and development, technology transfer, economic incentives, and technical assistance,
- the **sectors** of the economy include production, energy (efficiency), product design, and renewable fuels,
- international **ventures** includes the promotion and dissemination by industrialised nations of low-polluting and low-waste technology in developing countries,
- public **education** includes providing information on consumer products and the consequences of business and industrial activity in their communities.

Concludes that:

- **Continued progress** in environmental protection will require application of both innovative and traditional approaches for pollution control,
- **Pollution prevention** is the best possible solution for environmental protection on both environmental and economic grounds, being potentially the most effective method for reducing risks to human health and the environment and for containing costs.

Calls on all governments to:

- **Orient** their existing environmental programs to emphasise pollution prevention,
- **Develop** and use compatible analytical methods to assess the costs and environmental impacts of the entire life cycle management of products,
- **Support** the development and dissemination of better designs for industrial processes, inter-alia, to reduce the use of energy and scarce raw materials, and toxic pollutants, and the release of pollutants,
- **Lead** in the adoption of pollution prevention techniques through government procurement practices the design and operation of government facilities, and the development of a mix of economic and regulatory incentives,
- **Allow** the maximum opportunity for flexibility and innovation in the design of pollution prevention approaches by industry and all other sectors of the economy,
- **Support** cooperative international ventures,
- **Involve** the public, as citizens and as customers, in pollution prevention through education,
- **Promote** the use of pollution prevention impact statements, and
- **Establish** through an international forum, an appropriate demonstration of pollution prevention.

REPORTS

ELECTRICITY AND THE ENVIRONMENT

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This paper was presented at the Senior Expert Symposium on Electricity and the Environment held in Helsinki, Finland, 13-17 May 1991. The Symposium was organised by the European Commission, Council for Mutual Economic Assistance, UN Economic Commission for Europe, International Atomic Energy Agency, International Institute for Applied Systems Analysis, Nuclear Energy Agency, UN Environment Programme, World Bank, World Health Organisation and World Meteorological Organisation, in cooperation with the Government of Finland.

INTRODUCTION

Just 16 years ago, when I worked for the Scientific Branch of the Greater London Council, the main environmental preoccupation over electricity generation in London was whether or not flue gas washing at Battersea Power Station was desirable from the point of view of protecting the health of the local population. At the time, this was seen as a major project, involving state-of-the-art monitoring of air pollutants and careful appraisal of the implications for borough residents of exposure to occasional peaks of sulphur dioxide. Such a task, however, now seems trivial compared with those of the present day, as a result of a series of traumas experienced over the past two decades. Concern is now no longer focussed purely on local health effects, nor even on 'routine' emissions of pollutants. Evidence of acidification in areas remote from the point of emission has led to recognition of the need for massive reductions in the emissions of sulphur oxides and nitogen oxides on a regional basis. Two oil 'crises' have brought about a realisation that over-reliance upon any single energy source spells vulnerability. And public attitudes to energy-related risks have been hardened by disasters at Chernobyl, Piper Alpha, and elsewhere. All of which is now over-shadowed by the further complexity of an international dimension resulting from the global implications of greenhouse gas accumulation in the atmosphere.

This has led to what some in the international arena refer to as a state of paralysis in the development of global electricity generation. While it is widely acclaimed that more generating capacity is needed in both developing and industrialised countries, in addition to improvements in efficiency, the questions raised by the new issues have, for the time being, obscured the way ahead. As a consequence, a major conference, organised by 11 intergovernmental organisations with interests in world development, the environment and economics, was held in Helsinki in May 1991. The main area of discussion was the potential of alternative fuel cycles for meeting global electricity requirements in the light of their comparative economic, environmental and health impacts and, secondly, to suggest a framework for incorporating these considerations into the planning and decision-making process for electricity production and use. What follows is a brief and, it is stressed, personal summary and comment on issues arising at this conference.

FUTURE ENERGY AND ELECTRICITY DEMANDS

The starting point for the conference was a review of future world energy needs, the role of electricity in satisfying these needs, and the associated environmental issues. The analyses which were presented all forecast an increasing demand for energy in all sectors of the globe from the industrialised countries (OECD), the Soviet Union and Eastern Europe (SUEE), to developing countries. It was felt that electricity supply would continue to increase in parallel with this demand, if not faster judging by past experience, subject only to constraints on economic growth, and indeed that this supply was a contributor to future development. However, it was recognised that the electricity sector could make a significant contribution towards containing future environmental impacts of energy use by a number of measures which included improvements in generation, supply and end-use efficiency; management of demand; and the use of 'cleaner' fuels, all of which would be necessary if serious progress were to be made. Renewable sources were also seen as a further tool by which environmental impacts might be addressed, but few delegates at this conference considered they would have a big role to play in the coming decades.

In particular, developing countries such as India and China, with massive coal reserves, expressed the view that they were practically bound to exploit these reserves because the alternative of, say, hydropower was increasingly being challenged because of its own local environmental impacts, and other renewables were as yet too expensive. It would be wrong to say that the global environmental consequences of increased coal consumption did not concern the developing countries. Clearly they figured very highly in their considerations (some felt too highly), but it was pointed out with considerable eloquence that the priority issues for developing countries remained those of the provision of health, education, and adequate water supplies. Only then would the underlying mechanism of population growth be checked (as had been the case with Western civilisations), and only then could more attention be given to global environmental problems, despite the fact that the developing countries are expected to suffer most as a result of them.

ALTERNATIVE FUEL CYCLES

Although it was recognised that efficiency improvement was possible throughout the electric power systems, from generation to end use, and that this had a substantial potential to reduce impacts, it was considered illusory that these efficiency improvements would obviate the need for additional measures including electricity supply options that emit fewer greenhouse gases.

However, coal remains the most abundant, cheapest and familiar option for electricity generation in many countries including the US, Britain and, as noted, India and China; and while many of its local or regional environmental impacts can now be limited by environmental control technologies, carbon emissions cannot, other than by efficiency improvements that enable more heat and electricity to be delivered per unit of coal consumed. This serves to place further pressure on other potential areas of emission reduction.

In terms of carbon emissions, oil offers a slightly improved prospect over coal at present (Table 1). However, owing to the perceived instability of oil supplies and their alternative uses in transportation and as industrial feedstock, it is expected that the contribution of oil to global electricity generation will diminish. In contrast, the role of natural gas as a means of generating electricity, especially in Europe, is forecast to increase significantly. Natural gas is a relatively inexpensive and clean option for countries having access, and will certainly make a significant contribution to reduced carbon emissions as a result of both immediate prospects of high conversion efficiencies in combined cycle power plants and its lower carbon content (Table 1). The bad news is that this is unlikely to be a long-term solution since natural gas reserves, although viewed more optimistically of late, are nonetheless finite. It is not inconceivable that this could lead to a straight coal versus nuclear choice, or, alternatively, more radical options for many countries at some time during the coming century.

The nuclear option itself presents a number of interesting challenges. Although there are some emissions of sulphur oxides, nitrogen oxides and carbon associated with the nuclear fuel cycle, there are none at the electricity generation stage, and clearly nuclear energy could make a significant contribution towards holding carbon emissions below what they would otherwise achieve. However, uncertainty over the medium- and long-term consequences of the Chernobyl disaster, for example, have been much discussed of late and will need to be clarified as well as broader issues of equity, resource availability, social settings and economic impact. In addition, safeguards must remain to prevent any linkage of civil nuclear power with weapons programmes. Evolutionary developments in reactor design, towards greater inherent safety and the incorporation of passive safety features, may also be significant factors influencing future decisions. Probably the prevailing view at the conference was that the present virtual moratorium on nuclear power would be breached within five to ten years, and that there would be an expansion of nuclear capacity in industrial and middle income countries, despite present public fears over its social acceptability.

Table 1

Fuel	Tonnes of carbon per toe
Coal	0.93
Fuel oil	0.82
Natural gas	0.57

Note: coefficients may vary according to precise fuel specification.

COMPARATIVE RISK STUDIES

As an aid to those who wish to place the risks of alternative electricity generation options in perspective a number of studies are now underway in Europe to assess the risk of complete fuel cycles. One of these studies is being carried out by the Risk Unit at the University of East Anglia, on behalf of Nuclear Electric. In this project, the risks of all stages of each electricity generation cycle are being examined, from fuel winning, extraction and transportation, to routine power plant operation, waste disposal, and decommissioning; alternative fuels, including nuclear, coal, oil, gas and some renewables, are being covered. It would seem reasonable that the risks of electricity generation (and other activities such as waste production and disposal) should be compared on this basis, and that this type of approach may contribute to an improved and less-fragmented understanding of the impacts of the various electricity generation options by the public, as well as assisting policy makers.

Apart from the risks of cancer and waste disposal, which are currently associated in the public psyche mainly with the nuclear cycle, there are also the risks of mining accidents and disease, transport of fuels and materials, and air pollution to consider. In addition one needs to address the potential for severe accidents. Such a potential exists for most electricity generation schemes at various stages of their fuel cycles. One only has to recall the Piper Alpha disaster, frequent mine accidents, and that even apparently benign cycles, such as the hydroelectric option, have contributed many fatalities on a worldwide basis over the years.

Of course, studies of the comparative risks of complete fuel cycles can hardly be expected to provide a complete resolution of the energy debate. The objective is to contribute to that debate by providing a dispassionate analysis of those risks which can be quantified, and a clear statement of the uncertainties.

EMERGING VIEWPOINTS

It is not possible to encapsulate the ideas expressed at the conference simply. Many opinions were expressed with major divergencies in emphasis. However, the tenor of the conference was unmistakably one of a radical rethink of the approach to planning of future electricity supply and demand management. It is clear that serious consideration will have to be given to a host of issues including the following:

- *abatement technologies* — in the case of nitrogen oxides and sulphur oxides, technologies exist to control emissions. A qualitatively different exception is carbon dioxide emissions from fossil fuels which introduces a new dimension into the overall decision-making process.

- *electricity planning* — increased emphasis will be given to the full range of environmental and health risks of electricity generation, and it is crucial that this be integrated into the decision-making on modes and mixes of electricity generation in order to reduce adverse impacts.

- *incorporation of externalities into energy costs* — welfare economics has attempted for over a 100 years to come to grips with external costs of human activities, e.g. the effects of pollution from electricity generation on health and the environment. Further research is urgently needed so that these costs can be internalised.

- *future supplies* — until the end of the 20th century supplies would predominantly be met by existing plant, expanded use of gas, greater investment in generating efficiency and demand side management. The next generation of generating capacity may be dominated by nuclear power plants, renewable technologies and low greenhouse gas fossil fuel electricity generation, depending on developments in technology, economics and risk perception. In particular, the extent of the nuclear contribution was expected to be determined by the degree of success in allaying public concern over health and safety, waste disposal and capital costs. For renewables to play a significant role, their costs must be reduced or seen to be acceptable and availability improved, and for coal, future clean firing technologies and high efficiency systems would need to be commercialised if it is to remain the dominant fuel along with natural gas.

- *urbanisation* — it is crucial that future urban planning decisions take full account of their energy and environmental implications in the broader sense.

- *levels of risk* — these should be evaluated on a full fuel cycle basis taking account of all sources and types of risk, e.g. immediate or long-term; health or environmental; catastrophic or routine; local, regional or global; etc.

- *public perception of risk* — there was a conflict between increasing demand for electricity worldwide, which would contribute to improved health and welfare, and the tendency to reject all risks associated with electricity generation. The issues would need to be debated more fully and openly.

- *energy security* — presents a further challenge. For most countries it will mean avoidance of heavy dependence on a single fuel or supplies. All options are therefore likely to be kept open as a means of ensuring diversity of supply.

- *efficiency improvement* — from generation to end use, has a substantial potential to reduce impacts and should be pursued vigorously, but alone will not be sufficient to control impacts. It must be recognised that both demand management and additional supply measures will be required. This will present a powerful challenge to market-based economies.

- *strategies to be country/region dependent* — OECD countries, because of their expertise, experience and financial resources, have a special responsibility for pioneering alternative strategies. The Soviet Union and Eastern European countries have considerable scope for contributing to impact reduction through energy efficiency improvement if financial resources are available. It is not possible to generalise about developing countries since their situations and resources are very varied. All will need more electricity in the future, and most will have to increase carbon emissions in order to support economic and social development. As a consequence, unprecedented international cooperation will be needed if the potentials for impact reduction are to be realised. The difficulties of this are only too apparent. Even the most advanced countries show signs of unwillingness to sacrifice much where this might impinge on their continued economic growth.

- *support for developing countries* — their present contribution to greenhouse gas emissions is comparatively small, but will grow as their main priority must be the more immediate problems of health and education, water supply and energy security. Therefore, the initiative on the global environment has to come from the developed world in the form of capital and technology transfer. The former should not be tied rigidly to emission reductions. This, and other aspects of the present international economic order, would only serve to restrict the development of developing countries and undermine attempts to cope with global environmental issues.
- *burden sharing* — central issues are how much effort should be allocated to the various impact reduction strategies, and what share of the effort should be undertaken by different countries or regions of the globe.
- *other contributors to greenhouse gas emissions and the role of the electricity sector* — contributors include practically every sector from agriculture to transport, and CFCs to methane. However, it was felt that the electricity sector, because of its public prominence, high level of centralisation, and analytical strength, was better placed than others to cope with the new order of environmental problems and should therefore take an initiative in the search for acceptable solutions.

Acknowledgement

The author thanks G. Edge, S. Rodliffe and L.E.J. Roberts for comments.

NEW NSCA PUBLICATION

AN INTRODUCTION TO POLLUTION

Increasing numbers of teachers, school pupils and members of the public want to know about pollution. This new illustrated booklet gives an overview of the problems that pollutants present in our environment. It looks in turn at the atmosphere, noise, waste and water, and gives a straightforward account of the pollutants, their effects and the controls needed to reduce their impact on our environment.

The booklet is designed to complement NSCA's series of information leaflets, which look in detail at individual environmental problems and the legislation governing them — details from NSCA.

Available from: National Society for Clean Air, 136 North Street,
Brighton BN1 1RG

Price: £3.00 including p&p. Discounts on bulk purchase by arrangement.

ROAD TRAFFIC POLLUTION AND PUBLIC NUISANCE

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INTRODUCTION

In recent years, the effects of motor vehicle emissions on human health and the environment have caused much concern to scientists, legislators and the public. Road traffic emissions include:

(a) exhaust pipe emissions
(b) fuel evaporative emissions
(c) engine crankcase blowby
(d) particulate emissions from the wear and tear of tyres, brakes and vehicle bodies.

Vehicles emit a wide range of inorganic and organic substances, including carbon monoxide (CO) and carbon dioxide (CO_2), nitrogen oxides (NOx), hydrocarbons (HC), volatile organic compounds (VOC), particulates and sulphur oxides (SOx). The environmental and health effects of motor vehicle pollution have been well documented in numerous scientific papers and reports (e.g. ref. 1). However, there is very little information available regarding the nuisance caused to the public from vehicle-derived pollutants. Road traffic affects the public in a wide variety of ways, many of which cause some degree of annoyance. The major disturbances to the public from road vehicles include:

(a) Pedestrian danger
(b) Visual intrusion
(c) Severance (restriction of access)
(d) Noise
(e) Vibration
(f) Dust and dirt
(g) Fumes/smoke/odour
(h) Visibility reduction
(i) Soiling
(j) Physical irritation

It is evident that in a busy traffic situation any or all of the items listed above may irritate the public, and these factors are likely to be synergistic in their effects. Many of the factors are inter-related and inter-dependent e.g. dust/dirt and soiling, smoke and visibility reduction, and hence it may be difficult for the public to decide which factor they find the most annoying.

Information about public attitudes and opinions to traffic nuisance is usually obtained through survey data via questionnaires and personal interviews, although at present, there is only a limited data base available. It is suspected that diesel vehicle emissions cause more nuisance to the public than petrol vehicle emissions since diesel engines produce higher levels of particulates, odour and smoke than well-maintained petrol engines. It should be emphasised however, that ambient air pollutants are derived from a number of sources, all of which may make a contribution to nuisance effects. This clearly makes it difficult to state that a particular pollutant derived from a single source is the sole cause of a nuisance effect.

This paper summarises the existing attitude and opinion survey data relating to public nuisance from vehicle-derived air pollutants (i.e. items (f)-(j) above) and also suggests the type of information that needs to be collected in order to quantify this nuisance.

NUISANCE FROM DUST AND DIRT

Vehicle generated dust/dirt includes carbon particulates (mainly from diesel exhaust); resuspended dust (due to vehicle generated turbulence); particulates (from tyres, brake and clutch linings and road/pavement wear); deposited rust and paint; inorganic compounds (e.g. leaded compounds); and de-icing salt.

A number of surveys have been conducted which include some data on the degree of public annoyance arising from vehicle generated dust and dirt. Social and Community Planning Research (SCPR) (ref. 2) conducted an extensive national survey in England in 1972 showing that:

> "Many people believe that traffic is responsible for much of the dust and dirt that settles on the window ledges, curtains or bookshelves in their homes."

Forty-eight percent of those people interviewed considered that "things get dirty very quickly here", although the respondents were fairly evenly divided as to whether traffic or other sources were mainly responsible for the dirt. The survey also showed that there was a relationship between public disturbance from vehicle-derived dust and dirt and increases in vehicle flow (see Figure 1). There appears to be a strong dependence between nuisance and traffic flow once a rate of 200 vehicles per hour is reached. If these results can be taken as representative, it suggests that large numbers of people are concerned by this form of vehicle nuisance, as 200 vehicles per hour is a very modest flow for UK roads.

Overall, SCPR found that noise was the greatest nuisance to people at home with dust and dirt a close second. For pedestrians, dust and dirt ranked third behind pedestrian danger and noise/fumes as a traffic related disturbance.

Studies performed by the Transport and Road Research Laboratory (TRRL) have shown that dust and dirt are of greatest nuisance to the public when they are indoors rather than when they are pedestrians. In a number of other studies (ref. 3-7), a range of questions, of both the free-response and structured types, have identified dust and dirt as a public nuisance through the use of questionnaires and personal interviews. Public comments included:

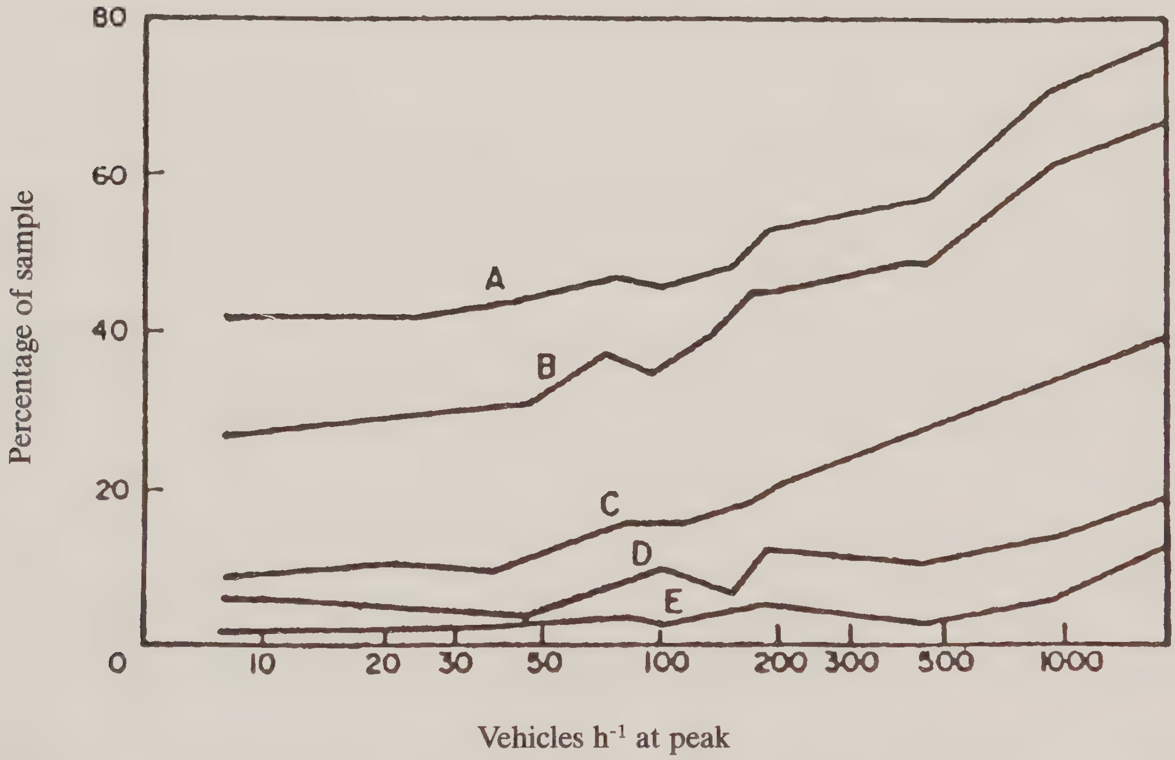
(a) complaints about traffic pollution making buildings dirty/discoloured;
(b) complaints about dirt on window sills and curtains;
(c) complaints about an area becoming generally dirtier as a result of increased traffic flows.

In spite of the general consensus that dust and dirt do constitute a public nuisance, there appears to have been no attempt to determine the correlation between actual measured levels of dust and the degree of public annoyance.

NUISANCE FROM SMOKE, FUMES AND ODOUR

The difficulties of interpreting data from public opinion surveys is illustrated by the frequent use of the word "fumes" in nuisance questionnaires. "Fumes" is an extremely tricky word to define (the NSCA in their glossary (ref. 8) have 3 definitions of fume(s)!) and this makes it difficult to pinpoint the exact cause of the public's annoyance. For example, respondents may use the word fumes when asked what concerns them most about road traffic when the real cause of displeasure is the malodour. Thus the overlap between the words smoke, fumes and odour must be borne in mind when considering survey data.

SCPR found in their national survey of England in 1971-72 that only 8 percent of their sample population noticed traffic fumes inside their homes, of which only 1 percent were bothered "very much" and 2 percent "quite a lot" (ref. 2). More than 90 per-



Key: A) Finds things get dirty quickly B) Disturbed by dust and dirt C) Seriously disturbed by dust and dirt D) Notice fumes E) Seriously disturbed by fumes

Figure 1: The relationship between public disturbance due to dust and dirt or fumes in the home and peak hour traffic flow outside the home (ref. 2).

cent of the sample said that they were not bothered at all by traffic fumes in their homes. The story was however quite different when people were asked if they noticed traffic fumes outdoors. Over half of the sample (54 percent) said that they noticed fumes from cars, lorries or buses when they were outdoors, and 23 percent said that they were bothered "very much" or "quite a lot". The public were also asked what effect(s) they thought that traffic fumes had on people in general, and on themselves personally. SCPR summarised the responses as follows:

> "Belief that traffic fumes can have harmful effects is widespread. Many people commented that fumes caused or aggravated respiratory ailments in the population generally. A quarter of the sample claimed that fumes affected their own health. People felt that lorries were by far the worst offenders as sources of traffic fumes."

In fact, 37 percent of the public felt that lorries gave out the worst fumes compared with 13 percent for buses/coaches, 3 percent for cars and 1 percent for motorbikes and mopeds. Overall, fumes ranked equal second with noise in importance as a public disturbance.

Figure 1 shows the relationship between disturbance from traffic fumes and vehicle flow derived by SCPR. Disturbance generally increases slowly with traffic flow, although this graph gives no indication of the proximity of the respondent's house to the road. This is an important consideration, since Hopkinson and Pearman (ref. 4) have noted a variation in the degree of nuisance experienced with distance from the road. Clearly, the inclusion of supplementary information such as the distance of the respondent's house from the road is necessary in order that the level of nuisance experienced by the public can be put into proper perspective.

Other studies by TRRL (ref. 9) and SCPR (ref. 10, 11) have also indicated that:

(a) the public perceive traffic fumes as a nuisance and a health hazard;
(b) when people notice fumes from road traffic, they are invariably bothered or annoyed to some degree.

The TRRL and SCPR reports conclude that the public's beliefs about smoke/fumes are more influenced by their own conceptions and assumptions than by any physical evidence, although this conclusion may be premature in the absence of air quality data.

The Department of the Environment (DoE) have recently (ref. 12, 13) commissioned studies to investigate public attitudes to a number of environmental issues. These studies have indicated that public awareness of the environment as a whole is increasing, and this can be illustrated by attitudes to car/traffic exhaust fumes (see Table 1).

It should be noted however, that many other issues, such as getting rid of nuclear waste, were of more concern to the public than car/traffic exhaust fumes.

Although the DoE question did not directly relate to nuisance, a number of other studies have also indicated that the public perceive fumes from traffic as a nuisance (ref. 4, 5, 7). Excellent reviews of the effects of a number of traffic management schemes in

Table 1: Public response to the question "How worried do you personally feel about each of these problems?" (ref. 12, 13)

	PERCENTAGES			
	Very worried		Quite worried	
	1986	1989	1986	1989
Car[1]/Traffic[2] exhaust fumes	23	33	37	42

[1] Used in 1986 question.
[2] Used in 1989 question.

London on the public have been performed by Ball and Caswell (ref. 14, 15). Their concern is mainly with smoke from diesel-engined road vehicles, and they state that:

> ". . .public concern is with the perceived effects of smoke emissions, and not the visible manifestations of the smoke itself. . ."

This conclusion was based on the fact that they were unable to find any evidence of public complaints about visibility reduction in the social surveys that they reviewed. They thus argue that soiling of property is a more accurate reflection of the impact that diesel emissions have on the public, and conclude that emission standards should be changed from a visibilty to a soiling-based criterion.

There appears to be little evidence to support the notion that vehicle-derived odours are a public nuisance. Hare and Springer (ref. 16) and Hare et al (ref. 17) attempted to evaluate the public perception of vehicle exhaust odours, but their studies were laboratory-based and provide no hard data on nuisance effects. Research by Springer (ref. 18) indicates a possible link between people's subjective response to diesel exhaust odours and their awareness and attitude towards air pollution. Surveys by SCPR and TRRL include complaints about the "fumes" from vehicles, but it appears that the public associate fumes with health effects rather than odour (ref. 2). The public opinion surveys reviewed by Ball and Caswell (ref. 15) also failed to find any evidence of traffic odours causing public disturbance. Karl Springer has recently commented (ref. 19) that he feels that vehicle odours will not cause any public nuisance because:

(i) the reduction of sulphur levels in fuel will cause fewer odourants to be produced;
(ii) the reduction in hydrocarbon emissions from vehicles made necessary by law will reduce odour levels;
(iii) ambient odourant levels will be cut through the use of catalyst after-treatment to reduce particulate emissions from diesel vehicles.

Overall then, the public do appear to experience some nuisance from smoke and fumes, both as pedestrians and in their homes. The ambient levels of smoke and fume necessary to cause this nuisance have not, however, been established. Additionally, although evidence shows that motor vehicles emit unpleasant odours into the urban atmosphere, these odours do not appear to cause any significant public annoyance, probably because of their short-lived and localised nature.

NUISANCE FROM VISIBILITY REDUCTION

Limit values for emissions of smoke from diesel road vehicles are specified by British Standard BS AU 141a and EC Directive 72/306/EEC. This legislation was introduced because it was felt that the public were concerned about the visibility reducing effects of diesel smoke. The social surveys reviewed in this paper include no evidence that supports this presumption. Although this does not conclusively demonstrate that the public are not bothered by traffic-induced visibility reduction, it does indicate that visibility reduction is not a major public concern. Legislation to be implemented in 1992 (the new combined ECE-15 (urban) and EUDC (extra-urban) test cycles), which set new exhaust emission standards, will also help to reduce this (and other) nuisances.

NUISANCE FROM SOILING

Soiling is generally regarded as the dirtying or blackening of surfaces by particulates. Road vehicles contribute to urban soiling mainly through the deposition of exhaust particulates onto surfaces. Diesel vehicles are the major sources of particulates and dark smoke in urban areas and are widely regarded as having a greater blackening propensity than petrol engine emission and coal fires (ref. 15). Assessment of the relative contributions of various sources to urban soiling is complex and may depend on a number of factors, such as:

- the particular soiling/dirt problem under investigation;
- the blackness per unit mass of smoke;
- the particle size distribution
- the chemical nature of the particles;
- substrate-particle interfacial binding;
- surface orientation;
- micrometeorological conditions.

Public complaints about soiling by vehicle-derived dust/dirt and smoke/fumes have already been considered above. Ball and Caswell (ref. 15) summarise the situation thus:

> "Judging by the results of the social surveys, public concern in Britain over soiling of property by road vehicles is widespread, with approximately 33 percent of the entire population being bothered or annoyed by it."

They go on to state that:

> ". . .as far as London is concerned, diesel-engined vehicles may well be the main source of soiling, and that a similar pattern could apply in other UK conurbations where smoke control of stationary sources has been carried out."

NUISANCE FROM PHYSICAL IRRITATION

Physical irritation includes effects such as coughing, sneezing, blinking and sore or runny eyes caused by irritation of appropriate tissues. These effects are easy to visualise in a busy roadside situation e.g. a wind-blown particle lodging in a person's eye. Although there have been many reports of air pollutants causing direct health effects, the classic example being the great London smog of 1952, studies of irritation caused by air pollutants are rare. A number of studies (ref. 20, 21) have reported increases in average eye irritation with increasing aldehyde concentrations, but since the measured aldehyde levels were so low and the analytical techniques available at that time were so inaccurate, this data must be regarded as unreliable. Compounds that have been identified as potential irritants in urban situations include ozone, ethylene oxide, biphenyl and a number of aldehydes and ketones. (ref. 1).

No public complaints about physical irritation due to vehicle emissions have been noted to date, although it should be emphasised that none of the opinion surveys reviewed appeared to ask a direct question about physical irritation. Hence, it is not possible to state whether the public view physical irritation from air pollutants as a nuisance because there are currently insufficient data available.

CONCLUSIONS

It is evident from the preceding sections that the public do experience a certain degree of nuisance from vehicle derived pollutants. Most of the public complaints concern dirt, dust, smoke, fumes and soiling of surfaces. There is currently insufficient evidence available to indicate conclusively that odour, visibility reduction and physical irritation are significant causes of nuisance, although where evidence does exist, it seems to indicate that odour and visibility reduction are not major public nuisances.

Evidence derived from social surveys also suggests that the nuisance experienced by a person depends on their situation e.g. at home, work, in a shop or as a pedestrian. The level of nuisance experienced by an individual may be affected by factors such as:

- the proximity of their home/workplace to a road;
- the amount of traffic on the road;
- the type of vehicles using the road;
- the duration of exposure to the air pollutants;
- the type and concentration of air pollutants present;
- the time period during which the individual experiences nuisance effects;
- the duration of the nuisance effect (e.g. is the nuisance continuous or short-lived?);
- personal habits (e.g. smoking);
- socio-economic status;
- the respondent's general awareness of their local environment.

Social survey techniques such as questionnaires and personal interviews are important methodologies for the assessment of people's subjective response to traffic pollutants and can be used to obtain data on many of the above factors. Using these methods, researchers can evaluate both the causes and the level of nuisance experienced by individuals in a particular set of circumstances, and predictive relationships may be derived from the data collected. However, evidence from social surveys alone is insufficient to allow legislators to make judgements about the subjective importance of air pollutants produced by road vehicles. Air quality data obtained in parallel with social survey data is necessary so that the relationship between subjective effects and pollution load can be investigated.

Two attempts have been made to link the degree of public nuisance to measured levels of air pollutants (ref. 22, 23). Both cases however, suffered from the same deficiencies:

(i) Ambient urban levels of subjectively important pollutants other than smoke were not investigated. It is clearly important that ambient concentrations of pollutants likely to cause nuisance effects are measured.

(ii) Insufficient data was collected from the social surveys to allow a full analysis of nuisance effects. For example, no direct questions about physical irritation effects appear to have been asked. There is also the problem discussed earlier concerning the ambiguity of questions containing the words smoke, fumes and odour.

(iii) Little attempt was made to compare the public's concern about nuisance from road traffic with issues that may worry them, so that concern generated by nuisance effects cannot be put into perspective.

These deficiencies must be remedied by further research before it will be possible to develop suitable criteria upon which decisions about future traffic management schemes can be based. A methodology for the evaluation of public nuisance from road traffic emissions is currently being developed jointly by Middlesex Polytechnic and TRRL.

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REFERENCES

(1) Ball, D.J., Brimblecombe, P. and Nicholas, F.M. (1991). "Review of air quality criteria for the assessment of near-field impacts of road transport". Dept. of Transport Contractor Report 240, Transport and Road Research Laboratory, Crowthorne.

(2) Morton-Williams, J., Hedges, B. and Fernando, E. (1978). "Road traffic and the environment". Social and Community Planning Research, London.

(3) Riddett, R.D. (1987). "The London Assessment Studies: Environmental Aspects." In *Environmental Issues.* Proceedings of Seminar P held at the PTRC Transport and Planning Summer Annual Meeting. University of Bath, England. Volume P300.

(4) Hopkinson, P.G. and Pearman, A.D. (1987). "Measuring residents' attitudes to environmental disturbances under multiple dimensions of impact and uncertainty." In *Environmental Issue.* Proceedings of Seminar P at the PTRC Transport and Planning Summer Annual Meeting. University of Bath, England. Volume P300.

(5) Pearce, K. and Stannard, C. (1973). "Catford traffic management study, volume II." GLC Research Report No. 17, GLC, London.

(6) WYT Consult (1977). West Yorkshire Transportation Studies, The Extent and Impact of Travel in 1975. Final Report — Volume 1.

(7) Halcrow, Sir William and Partners (1986). West London Assessment Study. Report on Problems. Plus technical notes 1 to 6 (25 volumes of technical notes).

(8) National Society for Clean Air and Environmental Protection (NSCA) (1989). *Pollution Glossary,* NSCA, Brighton.

(9) Mackie, A.M. and Davies, C.H. (1981). "Environmental effects of traffic changes." Department of the Environment, Dept. of Transport, TRRL Report LR1015. Transport and Road Research Laboratory, Crowthorne.

(10) Morton-Williams, J. and Prescott-Clarke, P. (1971). "Assessment of Environmental Disturbance in Areas Affected by Urban Road Schemes." Social and Community Planning Research, London.

(11) Hoinville, G. and Prescott-Clarke, P. (1972). "Traffic disturbance and amenity values." Social and Community Planning Research, London.

(12) Dept. of the Environment (DoE) (1986). *Digest of Environmental Protection and Water Statistics,* No. 9, HMSO.

(13) Dept. of the Environment (DoE) (1990). *Digest of Environmental Protection and Water Statistics,* No. 12, HMSO.

(14) Ball, D.J. and Caswell, R. (1982). "A report to the London lorry ban inquiry: smoke from diesel engined road vehicles — an investigation into public attitudes, soiling and technical factors." GLC Scientific Branch Report No. ESD/R95, GLC, London.

(15) Ball, D.J. and Caswell, R. (1983). "Smoke from diesel-engined road vehicles: an investigation into the basis of British and European emission standards." Atmos. Environ., 17, 169-181.

(16) Hare, C.T. and Springer, K.J. (1971). "Public response to diesel engine exhaust odours." Final report to EPA Contract No. CPA-70-44.

(17) Hare, C.T., Springer, K.J., Somer, J.H. and Huls, T.A. (1974). Paper 740214, presented to the 1974 Annual General Meeting of the SAE.

(18) Springer, K.J. (1974). "Combustion odours — A case study in human responses to environmental odours". Ed. by Turk, A., Johnston, J. and Moulton, D. Academic Press, New York, 250-261.

(19) Springer, K.J. (1990). Personal communication.

(20) Orcutt, J.A. and Taylor, J.R. (1960). "Correlation of eye irritants with concentrations of ambient air contaminants by probit analysis of the quantal response of human panels." Analysis Paper No. 36, Los Angeles County Air Pollutant Control District, Los Angeles, California.

(21) Renzetti, N.A. and Bryan, R.J. (1961). "Atmospheric sampling for aldehydes and eye irritation in Los Angeles smog — 1960." J. Air Pollut. Control Assoc., 11, 421-424.

(22) Mackie, A.M. and Griffin, L.J. (1977). "Before and after study of the environmental effects of Tring bypass." Dept. of the Environment, Dept. of Transport. TRRL Report Number LR746. Transport and Road Research Laboratory, Crowthorne.

(23) Hedicar, P.G. (1979). West Yorkshire Transportation Studies 3. Analysis of Environmental Issues. Traffic Engineering and Control, 82-85.

BRIEFING

ENVIRONMENTAL PROTECTION ACT 1990

INTEGRATED POLLUTION CONTROL

The final versions of general industry sector guidance notes covering the fuel and power industry, metal industry, mineral industry, chemical industry and waste disposal industry have now been published and are available from HMSO. These notes give general guidance to HMIP on specific industry sectors to enable them to deal with applications for authorisations for new processes and for substantial changes to existing processes. More detailed guidance will be given in the process guidance notes which will be produced over the next few years.

So far, only one Process Guidance IPR Note has been published in its final form — IPR 1/1 covering large boilers and furnaces 50 MW(th) and over. The following have been published in draft.

Combustion Processes (1.3)

IPR 1/2	Gas turbines
IPR 1/3	Compression ignition engines 50 MW(th) and over
IPR 1/4	Waste oil burners 3 MW(th) and over
IPR 1/5	Combustion of solid fuel manufactured from waste in appliances with a net rated thermal input of 3 MW or more
IPR 1/6	Combustion of fuel manufactured from or is comprised of tyres, tyre rubber or similar rubber waste in appliances with a net rated thermal input of 3 MW or more
IPR 1/7	Combustion of solid fuel which is manufactured from or is comprised of poultry litter in appliances with a net rated thermal input of 3 MW or more
IPR 1/8	Combustion of solid fuel which is manufactured from or is comprised of wood waste or straw in appliances with a net rated thermal input of 3 MW or more

Carbonisation Processes (1.2)

IPR 1/9	Carbonisation and associated processes
IPR 1/10	Carbonisation processes

Gasification Processes (1.1)

IPR 1/11	Gasification of solid and liquid feedstocks
IPR 1/12	Process: refining of natural gas
IPR 1/13	Process: the refining of natural gas at liquified natural gas sites
IPR 1/14	The odorising of natural gas of liquified petroleum gas

Petroleum Processes (1.4)
IPR 1/15 Crude oil refineries
IPR 1/16 On-shore oil production

IPC IN SCOTLAND

The Government has invited comments on its proposals for determining the enforcement authority for IPC processes in Scotland, as well as proposals for cost recovery charging. IPC is to be implemented in Scotland from 1 April 1992.

Enforcement Authority

Section 1(8) of the *Environmental Protection Act* lays down that the enforcing authority in relation to releases of substances into the environment shall be either the Chief Inspector (HM Industrial Pollution Inspectorate — HMIPI) or a river purification authority (RPA). Where an RPA is to be the enforcing authority, the specific RPA should be stated.

The Government propose that for those IPC processes in Scotland where there is a prescribed release to air and not to water, then the enforcing authority should be HMIPI; similarly where the main discharge is to water, then an RPA should be the enforcing authority. It is suggested that releases of special waste to land be dealt with by HMIPI and releases of significant amounts of special waste to water and lesser amounts to land by an RPA.

There are, however, a number of processes which give rise to significant releases to both air and water. These are; carbonisation and associated processes (1.2); petroleum processes (1.4); iron and steel (2.1); non-ferrous metals (2.2); petrochemical processes (4.1); manufacture and use of organic chemicals (4.2); acid processes (4.3); processes involving halogens (4.4); inorganic chemical processes (4.5); incineration (5.1); recovery processes (5.2); di-isocyanate processes (6.2); and tar and bitumen processes (6.3). The Government recognise that there are arguments in favour of both HMIPI and RPAs having responsibility for these processes, but is in favour, at least initially, of HMIPI acting as the enforcement authority mainly because of their closer links with HMIP.

Cost Recovery — IPC

The Government is proposing to adopt a similar system to that applying in England and Wales, with the addition of a fee to cover the consulted authority (i.e. HMIPI or the RPA, as appropriate).

It is therefore proposed that the enforcing authority's charge for an initial application should be £1100 per component, plus £350 per component for the enforcing authority's charge. Charges for an application for a substantial change would be £350 and £120 per component, respectively; for an application for an existing scheduled process a charge of £700 per component is proposed for the enforcing authority and £230 per component for the consulted authority.

An annual charge of £520 per component is proposed for HMIPI administered processes in addition to the RPA element which would be assessed individually and processes notified of the charges at the start of the year.

Cost Recovery — Local Authorities

Here it is proposed to structure the charges on a similar basis to that applying in England and Wales: an initial application fee of £800 (£530 for processes registered under the *Alkali Act*); £530 for a substantial change and an annual charge of £500 per process. For waste oil burners not exceeding 0.4 MW, the charges would be £100, £65 and £100 respectively. Any increases made to the charges in England and Wales for the year 1992-93 would also apply in Scotland.

PROCESS GUIDANCE NOTES

A further 25 Process Guidance Notes (see below) covering processes coming under local authority air pollution control have now been published. Details of other PG Notes which have been published were included in Clean Air, Spring 1991. Copies of PG Notes have been sent to all local authorities and are also available through HMSO.

The PG Notes published in July cover the following:

PG 2/2(91)	Hot Dip Galvanising Processes
PG 2/3(91)	Electrical and Rotary Furnaces
PG 2/4(91)	Iron, Steel and Non-Ferrous Metal Foundry Processes
PG 2/5(91)	Hot and Cold Blast Cupolas
PG 2/6(91)	Aluminium and Aluminium Alloy Processes
PG 2/7(91)	Zinc and Zinc Alloy Processes
PG 2/8(91)	Copper and Copper Alloy Processes
PG 2/9(91)	Metal Decontamination Processes
PG 3/5(91)	Coal, Coke and Coal Product Processes
PG 3/7(91)	Exfoliation of Vermiculite and Expansion of Perlite
PG 3/8(91)	Quarry Processes including Roadstone Plants and the Size Reduction of Bricks, Tiles and Concrete
PG 3/9(91)	Sand Drying and Cooling
PG 3/10(91)	China and Ball Clay
PG 3/11(91)	Spray Drying of Ceramic Materials
PG 3/12(91)	Plaster Processes
PG 3/13(91)	Asbestos Processes
PG 3/14(91)	Lime Slaking Processes
PG 6/1(91)	Animal By-Product Rendering
PG 6/7(91)	Printing and Coating of Metal Packaging
PG 6/8(91)	Textile and Fabric Coating and Finishing Processes
PG 6/9(91)	Manufacture of Coating Powder
PG 6/12(91)	Production of Natural Sausage Casings, Tripe, Chitterlings and Other Boiled Green Offal Products
PG 6/13(91)	Coil Coating Processes

PG 6/14(91)	Film Coating Processes
PG 6/15(91)	Coating in Drum Manufacturing and Reconditioning Processes

A further batch of draft notes have also been published:

PG 1/10	Waste derived Fuel Burning Processes < 3MW
PG 6/19	Fish Meal and Fish Oil
PG 6/20	Paint Application in Vehicle Manufacturing
PG 6/21	Hide and Skin
PG 6/22	Leather Finishing
PG 6/24	Pet Food
PG 6/25	Vegetable Oil Extraction, Fat and Oil Refining
PG 6/26	Animal Feed Compounding

DUTY OF CARE

The Department of Environment has published a draft circular, consultation paper and draft regulations aimed at bringing the duty of care provisions of the *Environmental Protection Act* into effect in April 1992. Section 34 of the Act imposes a legal duty of care on everyone — from producers, to carriers and disposers of waste — to ensure that

— waste is not illegally disposed of or dealt with without a licence or in breach of a licence or in a way that causes pollution or harm;

— waste does not escape from a person's control;

— waste is transferred only to an "authorised person," such as a local authority, a registered carrier or a licensed disposer;

— when the waste is transferred, it is accompanied by a full written description so that each person who has it knows enough to deal with it properly and thus avoids committing an offence under section 33 of the Act.

The duty does not apply to domestic householders in respect of their own domestic waste. The duty does however apply to a householder who disposes of household waste from a neighbour's property; it also applies to builders disposing of rubble etc. from a house in which they are working. Special waste is also covered by the duty of care; such waste must of course also comply with the requirements of the *Control of Pollution (Special Waste) Regulations 1980.*

The Regulations covering England, Scotland and Wales, will provide for a mandatory system of signed transfer notes and require all those subject to the duty of care to keep records of waste received and transferred. Information to be recorded must include details of the waste, quantity, whether/how containerised, names and addresses of those involved in the transfer, and place and date of transfer. Records of all waste must be kept for at least two years.

Where a waste regulation authority (WRA) wishes to assure itself that the duty of care is being complied with, or to follow up a suspected unlicensed dumping of waste, it may serve notice on a waste holder requesting copies of relevant documents within seven days. WRAs may only serve notices on waste holders whose principal place of business is in their area or to whom they have granted a waste management licence.

WRAs wishing to have access to documents in another area may do so through the WRA for the area or ask the waste holder to provide access to documents voluntarily.

A statutory code of practice giving practical guidance on how to discharge the duty of care has been drawn up by the Department of Environment and the Welsh Office, and a similar code for Scotland by the Scottish Development Department. Breach of the code is not an offence (although breach of the duty of care is). It is however admissible in court as evidence in deciding if a breach of the duty has occurred.

A joint circular from the Department of Environment, Welsh Office and Scottish Office, mainly directed at local authorities, gives advice on the operation of the duty of care. It complements the advice for producers and holders of waste given in the code of practice.

UPDATE

RCEP REPORT ON DIESELS

The Royal Commission on Environmental Pollution has published its report on emissions from heavy duty vehicles*. The report, the first in a series of short studies was begun last year and focussed on

- emission limit values for new vehicles and engines;
- standards to be achieved by vehicles in service; and
- the contribution which fuel can make to the control of emissions.

It also considered the impact of nitrogen oxides and particulates, and explored the scope for using economic instruments to encourage the early implementation of limit values for new engines and to raise the standards of existing vehicles.

The Commission notes that since its Tenth Report (*Tackling Pollution — Experiences and Prospects*, 1984), there has been a steep rise in the distance driven by heavy duty vehicles and a steady increase in the power of a typical vehicle. European guide values for air quality are being exceeded regularly in London and some other British cities as a result of emissions of oxides of nitrogen (NOx), to which diesels are major contributors. Diesel particulates are believed to be carcinogenic and are the major cause of soiling of buildings. The Report therefore pays particular attention to emissions in urban areas because of the concentration of vehicles, people and buildings there.

The Commission suggests that further reductions in emissions of both NOx and particulates should be sought before the end of the decade, and it supports the Government's proposal for the EC test for new heavy duty diesel engines to be made more demanding. It also calls on the Government to proceed urgently with trials of traps fitted to exhausts to catch particulates; a grant should be offered for fitting these to buses. The Commission calls on the Government to require that heavy duty engines are kept in good condition and to develop a diagnostic test of engine condition. Legislation should require new engines to be designed to maintain good emissions performance over prolonged periods of operation.

The Commission proposes the creation of financial incentives including reduced rates of vehicle excise duty, for using engines with lower emissions levels. Such incentives would help to speed up the replacement of vehicles and engines with new, less polluting ones. It also suggests that incentives be created for the early introduction and use of low sulphur fuel, and proposes that a study should be carried out to establish the feasibility of encouraging bus operators to make use of alternative fuels such as petrol, liquified petroleum gas, compressed natural gas or electricity.

The RCEP's next short study will focus on incineration.

* *Fifteenth Report of the Royal Commission on Environmental Pollution, Cm 1631, ISBN 0 10 116312 6, HMSO £12.00.*

INTERNATIONAL CO_2 PROJECT

British Coal is heading a three year research project on behalf of the International Energy Agency aimed at cutting down carbon dioxide and greenhouse gases from fossil fuel plant. The Netherlands, Denmark, UK, America, Sweden and Norway have joined the project, which is being financed by the governments and industries of the participating countries. The Commission of the European Community is also a signatory to the agreement, and several other countries, including Japan, Canada and Italy have expressed their intention to join the scheme.

The main objective of the work which will be carried out at British Coal's Research Establishment is to look at the carbon utilisation cycle from extracting the coal, using it for power generation, capturing the carbon dioxide and then finding the best ways of storing the gas. Environmental considerations will form a main part of the study and the intention is to establish what impact the schemes being considered would have on power production costs.

PETROLEUM COKE RESTRICTIONS

The Department of Trade and Industry has agreed a code with fuel importers to restrict the sale of petroleum coke unless it is for use on an open fire and has been pre-blended with another smokeless fuel. For some years, the Solid Smokeless Fuels Federation, Domestic Coal Consumers Council, Solid Fuel Advisory Service and British Coal have been publicising the dangers of burning pet coke on certain domestic appliances. Its extremely high heat content, combined with low ash and high sulphur properties can cause considerable damage to appliances. The DTI is also recommending that open fires using pet coke should have a fire spark guard.

ACCESS TO INFORMATION

The Department of Environment and HMIP have published a leaflet *The Environmental Protection Act 1990, Part I AND YOU* — explaining the right of the general public to comment on applications for authorisations and to see information about scheduled processes on the public registers. Copies of the leaflet, which has been sent to local authorities and port health authorities in England and Wales, are available from the Department of Environment.

SMOKE CONTROL AREAS

As 1 April 1993 draws ever nearer — the date by which all areas of the UK will be required to meet EEC air quality limits for sulphur dioxide and smoke — the Solid Smokeless Fuels Federation report that a further 139,000 houses were covered by new smoke control orders during the year ending 31 March 1991. Over 40 local authorities, mainly in the North East, Yorkshire and the Midlands are still completing programmes. However, there is some concern that the 1993 deadline will not be met unless more funds are made available by the Department of Environment to enable local authorities to speed up their programmes.

As at 31 December 1990, there were a total of 6429 operational smoke control orders, covering nearly 10 million premises in the United Kingdom.

AUTHORISED FUELS

The Regulations covering authorised fuels in England and Wales and in Scotland under the *Clean Air Act 1956* have now been consolidated into the *Smoke Control Areas (Authorised Fuels) Regulations 1990.* All previous Regulations are revoked.

Although most of the fuels in the new Regulations have previously been authorised fuels, there have been changes in the way in which the fuels are described in many cases. The descriptions reflect current manufacturing methods.

Ancit 40 and 60 briquettes, anthracite, electricity, Extracite briquettes, Flamelite pellets, gas, low volatile steam coals, Maxibrite and New Taybrite briquettes continue to be authorised for use in any part of Great Britain. Anthracine N20, Antrex, Fireglo, Sovereign, Thermac, Thermaglow and Thermobrite briquettes were only previously authorised for use in England and Wales but may now also be used in Scotland, Centurion briquettes and semi-anthracite were only previously authorised for use in Scotland but may now also be used in England and Wales.

Anthranor, Clean Flame, Phurnacite and Supertherm briquettes and Pureheat ovoids are authorised for use for the first time in any part of Great Britain. Homefire briquettes, Sunbrite, Beacon Beans, Monckton Boiler Beans, Dutch (Sluiskil) Coke Doubles and Coalite are authorised for use in any part of Great Britain by name for the first time.

OZONE LAYER DEPLETION

The fourth report of the Stratospheric Ozone Review Group published in July confirms that ozone depletion in northern hemisphere mid-latitudes has now reached 8 percent per decade in late winter and spring, and significant further losses are anticipated as a result of present increases in atmospheric chlorine loading. An increase in the flux of ultraviolet radiation, as a direct result of ozone loss, has also been reported in Antarctica and recent observations have indicated a temperature reduction in the lower Antarctic stratosphere associated with the ozone hole, which was as severe in 1990 as in any previous year.

The report also notes that atmospheric concentrations of ozone-depleting chlorine are likely to continue to rise until at least the end of the century. The chlorine comes from chemicals like CFCs, which are still widely used for refrigeration and air conditioning, and methyl chloroform which is used as a solvent, particularly in the engineering and electronics sector. The report draws attention to the impact of ozone depletion on surface temperatures. Although CFCs in themselves are strong greenhouse gases, a reduction in stratospheric ozone may have a slight surface cooling effect. However, the extent of such a cooling is not well quantified and further work is required. This will be considered by the review process currently being undertaken by both the UNEP Montreal Protocol Scientific Assessment and the second phase of the IPCC process.

The Stratospheric Ozone Review Group was set up in 1985 by the Department of the Environment and the Meteorological Office to: (i) review current understanding of ozone in the stratosphere, the threat to it from human activities, and related issues; (ii) recommend areas where further research, within the national effort, is required; and (iii) provide advice to the department on scientific matters relating to policy issues concerning stratospheric ozone and related topics.

OZONE DIRECTIVE

The European Commission has published a draft Directive on air pollution by ozone (COM(91) 220 final). The Directive includes proposals for monitoring and exchange of information. A warning system is proposed for episodes when ozone concentrations exceed thresholds above which there is considered to be a health risk. The values proposed by the Commission, which should not be exceeded, are based on WHO recommendations, are

1. Health protection threshold (lengthy exposure: 110 μg/m^3 (55 ppb) for the mean value over eight hours;
2. Vegetation protection thresholds: 220 μg/m^3 (100 ppb) for the mean value over one hour; 65 μg/m^3 (32.5 ppb) for the mean value over 24 hours;
3. Health protection warning value (short exposure): 175 μg/m^3 (87.5 ppb) for the mean value over one hour.

SUSTAINABLE DEVELOPMENT RESEARCH

The United Nations Research Institute for Social development (UNRISD) is a small autonomous research organisation based in Geneva. It specialises in research on aspects of contemporary social development, and is currently conducting a research programme on sustainable development through people's participation in resource management.

The research aims to contribute to understanding, not only of the ways in which local individuals contribute to the success of conservation projects funded by outside donors, but also of the ways in which people take sustainable development into their own hands, either by working to maintain their traditionally sustainable resource management systems, or by acting to resist projects or policies which will adversely affect their livelihood by degrading the environment. Reports have already been published for studies conducted in Ethiopia, Tanzania, northern Mexico and India. Studies are underway in southern Mexico, Sudan, northeastern Tanzania, the African drylands, the Philippines, Ghana, Solomon Islands, Senegal, the Himalayas, Brazil, and the Amazon region.

The research is being undertaken in

coordination with related UNRISD research on the environment. The "Social Dynamics of Deforestation in Developing Countries" programme includes natural and regional analysis of the implications of deforestation for the livelihood and living conditions of poverty groups in urban and rural areas. Individual, family and group reactions and strategies to combat the adverse effects of environmental degradation are assessed, as are interactions with other key actors such as agencies of the state, modern commercial interests, non-governmental organisations and grassroots movements. The UNRISD research programme on "Women, Environment and Population" is conducting micro-level empirical research to investigate the relationships of different forms of environmental degradation with women's time-use patterns and activities, as well as with morbidity, mortality, fertility and migration decisions. Studies are underway in Kenya, Malaysia and Mexico. The research programme on "Population Dynamics, Environmental Change and Development Processes," still in an early stage of development, will examine the relationship between economic activities, environmental quality, and population size and distribution.

UNRISD was established nearly 30 years ago to promote research on the most pressing issues of development. Inquiries about UNRISD research programmes and/or available publications should be addressed to: Reference Centre, United Nations Research Institute for Social Development, Palais des Nations, CH-1211 Geneva 10 Switzerland. *(From Adrienne Cruz, Assistant to the Director, UNRISD)*

CONTROL OF AIRCRAFT NOISE

The Government's White Paper (*This Common Inheritance*) published last September undertook to review the current arrangements for protecting communities near airports, in particular near small airfields, from noise and also to review the control of noise from helicopters using temporary sites.

Current requirements for controlling noise from airports is largely contained in the *Civil Aviation Act 1982;* section 78 allows the Secretary of State to specify noise reduction measures at designated airports, e.g. limitations on number and times of take-offs and landings — Heathrow, Gatwick and Stansted are designated in this way. Airports designated under section 79 of the Act may be required to provide grants towards sound proofing buildings and section 5 requires the CAA, where requested by the Secretary of State, to take into account environmental factors in considering airfield licences. Under section 35 the Secretary of State may require an airport to provide a mechanism for consulting users, nearby local authorities and other representative groups.

In a consultation paper published by the Department of Transport in August, no changes are proposed to the section 35 requirements. Proposals are put forward for devolving the Secretary of State and CAA powers in Sections 78-79 and 5 to local responsibility. Designated airports would be under a statutory duty to produce a scheme for ameliorating noise from aircraft take offs and landings and from sources on the ground. There would be a requirement to consult locally and to agree the scheme with the local authority. Only if agreement could not be reached would the scheme be called in for decision by the Secretary of State.

So far as helicopters are concerned, at the moment they may use temporary sites for up to 28 days a year without planning permission. Here the Government proposes to amend the *Environmental Protection Act* to allow local authorities to take action to restrict or prevent flights if it could be shown that they were causing a nuisance.

Comments are requested on the Department of Transport's proposals before the end of the year.

NOISE REVIEW

Speaking at the IEHO Conference held in Brighton in September, Environment Minister David Trippier announced that he would be setting up a small working party to look at the particular problems of controlling noisy parties. Guidance for EHOs and the police on their existing powers for controlling such parties is currently being finalised. The Working Party will be asked to recommend practical improvements to the current procedures.

The Minister also drew attention to a code of practice which is being drafted by the Home Office and Health and Safety Executive on organising pop concerts. A draft is to be issued for consultation and will cover nuisance and risk to health both to those at the concerts and to those in the vicinity.

REGISTRATION OF WASTE CARRIERS

The *Controlled Waste (Registration of Carriers and Seizure of Vehicles) Regulations 1991* to be implemented from 14 October 1991 require waste regulation authorities to establish a register of waste carriers, and waste carriers to apply for registration. The Regulations, which are similar to the draft proposals published earlier this year (see Clean Air, Spring 1991), make it an offence as from 1 April 1992 to transport waste without a registration. Registration will cost £95 and renewal £65.

Where the waste regulation authority has reasonable grounds to believe that a vehicle has been used for flytipping and has been unable to find out who was responsible, it can apply to a magistrate (sheriff in Scotland) for a warrant to seize the vehicle.

DRAFT ENVIRONMENTAL STANDARD

The British Standards Institution has published a draft Environmental Management System standard. The standard has been written to help companies and organisations tackle environmental issues. It describes a system of management which companies can use to ensure that they comply with environmental legislation and regulations; that their products or services are produced, delivered and disposed of in an environmentally friendly manner; that expenditure on environmental protection is timely and effective, and that planning for future investment and growth reflects market needs concerning the environment. The standard is due to be finalised before the end of 1991.

BRITISH COAL ENVIRONMENT POLICY

British Coal has now published a detailed environmental policy which aims to help it balance the need to achieve its business aims with the need to satisfy society's rising environmental aspirations and to improve the quality of the environment in local communities. The policy takes the form of a framework policy with detailed policies covering its activities — deep mines, opencast, coal products and coal in use.

The various policy documents outline practice which should be adopted with regard to such issues as waste management, transport, avoiding nuisance to local communities, land management and restoration and staff training.

British Coal has also drawn up a statement of principles dealing with environmental audits; a programme of continuous auditing covering the items in the policy documents will be undertaken at British Coal sites. In addition a corporate environmental audit will be commissioned every three years; this will look at British Coal's policies, management structures and responsibilities, complaints, communications and training, and audit procedures.

NEW BOOKS

REVIEW OF MUNICIPAL SOLID WASTE INCINERATION IN THE UK

P. Clayton, P. Coleman et al. Warren Spring Laboratory. 1991. £60. ISBN 0856246344.

This report, commissioned by the Department of the Environment reviews current and future legislation and its implications with regard to the ability of UK municipal solid waste incinerators to meet new EEC emission standards. The survey finds it unlikely that many incinerators currently in operation can meet these requirements — but that operational changes could lead to significant improvements and that upgrading of current plant is required.

THE ENVIRONMENTAL PROTECTION ACT 1990

S. Tromans. Sweet and Maxwell. 1991. £20. ISBN 0421 442603

The complete text of the Act is reproduced with commentary on the substance and practical implications of the legislation. Indexes of case law, statutes, statutory instruments and EEC legislation supplement the guide.

ENERGY WITHOUT END

M. Flood, Friends of the Earth, 1990. £6.95. ISBN 0905966872.

An examination of the energy alternatives available to the UK, if we are reduce our use of fossil fuels and nuclear energy. This report provides a useful overview of modern systems for harnessing wind, water, solar and other renewable energy sources in use around the world and assesses their suitability for use here.

THE FUTURE FOR UK ENVIRONMENT POLICY KEY PLAYERS, ISSUES AND IMPLICATIONS

Adrian Webb. The Economist Intelligence Unit, 1991. £130. ISBN 0 85058 562 7.

Yet another report for the "green bandwagon" shelf. This report sets out to examine the key players involved in green issues and to assess their environmental policies. It discusses whether existing and proposed future policies will lay the foundations for business to exploit the opportunities generated by the green economy.

Regrettably for a research unit with the reputation of the EIU, the author's knowledge of English literature — Chaucer, Lord Byron, Wordsworth and Sir John Betjeman are just a few of those mentioned — is rather more extensive than his knowledge of environmental legislation. Pages 38-40 discuss the wide-ranging provisions of the Environment (*sic*) Protection Act. This, according to the report, "establishes two new corporate bodies, the Environment Protection Commission and the Environment Protection Executive"...To be fair, the report does mention some of the genuine provisions of the Act relating to integrated pollution control. However, it is difficult to recommend a report which contains such a fundamental error — particularly when that report costs £130.

QUALITY CRITERIA FOR MODELS TO CALCULATE AIR POLLUTION

C.M. Dekker, A. Groenendijk, C.J. Sliggers, G.K. Verboom. Ministry of Housing, Physical Planning and Environment, The Netherlands, 1991. Dfl 12.50.

The increasing importance of computations with models and the lack of formal quality assurance in this field has led to an investigation about how this quality can be obtained. The results of the research are presented and the report recommends a list of quality criteria on the following aspects: description of the mathematical model; programming models; user-friendliness of computer models; after-sales activities.

It is suggested that the quality criteria may be used by developers to improve the quality of mathematical models, by producers to improve software and ensure that proper logistical support is provided, and by users as an aid to assessing the packages available.

CAMPAIGNERS GUIDE TO OPENCAST COAL MINING

CPRE, 1991. £8.

A comprehensive manual covering background to the industry and the planning system as well as campaigning. A list of essential reading and references is included.

UNWELCOME HARVEST

G.R. Conway, J.N. Pretty. Earthscan, 1991. £15. ISBN 185383036.

A lengthy analysis of all aspects of agricultural pollution — covering pesticides, fertilisers, air, water and land pollution and the control of pollution and the effects of this pollution on the agriculture industry. It focuses on the United States, developing countries and United Kingdom.

COSTING THE EARTH

Frances Cairncross. Economist Books. £16.99. ISBN 0 09 174918 2.

In the first part the Economist's Environment Editor shows that she is in touch with the current environmental debates, encouraging us to ask questions (why ban artificial cancer-causing pesticides but not many natural ingredients which are just as dangerous), and reminding us that growth can be green*er*, though never totally without environmental impact.

Part two brings in examples of good practice from business, setting "The Challenge to Companies". If chemical companies in the USA can set zero emissions as a target and Switzerland's biggest retailer can sell toothpaste without that unnecessary cardboard box, then why not here? You wouldn't be that surprised at the conclusions: smart companies can make plenty of money out of being ahead in the environmental games, and "Together, wise government and inventive industry could be a formidable alliance for a greener world". *(from Simon Hickmott)*

THE PESTICIDE HANDBOOK

P. Hurst, S. Hay, N. Dudley. Pluto Press, 1991. £22.50. ISBN 1851720413.

A practical guide aimed at trade union members, health and saftey workers etc. which covers pesticides, their uses, health risks, the pesticides industry and legislation, with an extensive glossary of pesticide related terms.

AIR POLLUTION AND CHILD HEALTH

Dr. Cathy Read. Greenpeace, 1991. £5. ISBN 1871532469.

A survey of research into the effects of major air pollutants on children's health. The findings suggest that common pollutants do pose a significant threat, increasing the incidence of respiratory infection — cases of asthma, bronchitis and allergies are all growing. Lung function may be impaired by ozone and there is still a risk from lead in the environment. However, long term effects on health are uncertain due to little research or monitoring in the UK.

RADIOACTIVE AEROSOLS

A.C. Chamberlain. Cambridge University Press. 1991. ISBN 0521401216.

The book examines both natural and accidental emissions of radiation into the environment — covering radon, and releases from bombs and accidents and looks at the effects of these on human health.

WORLD GUIDE TO ENVIRONMENTAL ISSUES AND ORGANISATIONS

Ed. Peter Brackley. Longman Current Affairs. 1990. £75. ISBN 0582062705.

This very useful compendium contains chapters on individual global environmental problems and an extensive directory of international, regional and national organisations.

GLOBAL WARMING: HOW LONDON BOROUGHS AND THE GOVERNMENT CAN RESPOND

London Boroughs Association, 1991. £10.

The report explains global warming, and concentrates on the ways in which local authorities can respond to the threat. Recommendations include better energy management, encouragement of park and ride schemes and cycle use, as well as central government investment in public transport and energy efficiency.

YEARBOOK OF INTERNATIONAL ENVIRONMENTAL LAW VOL 1 1990

Ed. G. Handl, Graham and Trotman, 1991. £95. ISBN 18533335878.

A review of internationally significant legal developments with contributions from experts around the world. Advances in key countries and regions and in international government are examined, and both non-governmental organisations and international government are reviewed. A legal bibliography and documents section provide a wealth of reference material.

AIR POLLUTION MODELLING — THEORIES, COMPUTATIONAL METHODS AND AVAILABLE SOFTWARE

P. Zannetti. 1990. £59. ISBN 1853121002.

A survey of contemporary methods of mathematical modelling techniques — covering point source dispersion, plume rise and surface deposition, together with discussions of current air pollution problems.

A NEW EEC WASTE MANAGEMENT STRATEGY ON THE EVE OF 1993

M.M. Buckens. 1990. European Study Service. 11,700 BF.

A comprehensive review of EC waste strategies covering the tightening of regulation, sectoral initiatives, new proposals and prospects for controlling the ECs estimated 2.2 million tonnes of waste.

THE ENCYCLOPEDIA OF ENVIRONMENTAL CONTROL TECHNOLOGY VOL 2 AIR POLLUTION CONTROL

Ed. P.N. Cheremisinoff, Kogan Page, 1989. £116. ISBN 087201245X.

Part of a three volume series, also covering hazardous waste and wastewater control technology, this encyclopedia provides information on monitoring methods and particle and gas control technologies.

BRITISH STANDARD BUILDINGS AND STRUCTURES FOR AGRICULTURE, BS 5502

Available from BSI Standards, Linford Wood, Milton Keynes MK14 6LE.

Part 33 is the guide to the control of odour pollution; it identifies those agriculture practices which can give rise to odour problems in farm buildings and structures and suggests how these can be reduced through good design.

BRITISH STANDARD CHARACTERISATION OF AIR QUALITY, BS 6069

Available from BSI Standards, Linford Wood, Milton Keynes MK14 6LE.

Two new sections of the above standard have just been published: Section 3.2 Method for the Determination of Particulate Lead Compounds by Flame Atomic Absorption Spectrometry; Section 4.2 Method for the Determination of Asbestos Plant Emissions by Fibre Count Measurement.

CONTROLLING POLLUTION IN THE ROUND

A. Weale, T. O'Riordan, L. Kramme. Anglo-German Foundation for the Study of Industrial Society. £12.50. ISBN 0905492692.

A comparative analysis of environmental regulation in Britain and West Germany (pre-unification) — it examines the development of pollution control over the last 20 years, integrated pollution control, political and administrative systems, with a focus on the development and implementation of controls on SO_2 emissions.

OZONE RISK COMMUNICATION AND MANAGEMENT

Ed. E.J. Calabrese, C.E. Gilbert, B.D. Beck. Lewis Publishers. 1990. $82. ISBN 0873711300.

Major topics discussed are generation and transport of ozone, health effects, effects on vegetation and materials and methods of reducing ozone levels. The book concludes with an examination of the basis upon which US Environmantal Protection Agency Standards are set.

FUTURE EVENTS

28-29 OCTOBER — ADVANCES IN ENVIRONMENTAL IMPACT ASSESSMENT

Best practice for environmental impact assessment will be outlined for many applications including the waste water industry, roads, open cast mines and quarries, power stations, incinerators and urban infrastructure developments. Detailed reports will also be given of the experiences of those who have already carried out studies.
Fee: £465 + VAT.
Venue: Royal Lancaster Hotel, London W2.
Details: Alison Jones, IBC Technical Services Ltd. Tel: 071 637 4383.

4-7 NOVEMBER — WORLD CLEAN ENERGY CONFERENCE

The objectives of this conference are to evaluate viable solutions on how existing power resources can be rendered more environmentally compatible and to show their total internal, external cost, substitution possibilities and feasible propositions for clean, non-polluting energy production.
Venue: Geneva.
Details: CMDC, Kellerweg 38, CH-8055 Zurich. Tel: 411 463 9252.

12 NOVEMBER — THE PROPOSED BSI ENVIRONMENTAL MANAGEMENT SYSTEMS STANDARD

The introduction of the proposed BSI Environmental Standard will provide UK companies with the opportunity to acquire an essential environmental credential, the only independently verified and objective one of its kind and therefore likely to be highly valued by customers and investors alike. Fee: £250 + VAT.

Venue: Hyde Park Hotel, London W1.
Details: Westminster Management Consultants Ltd, Westminster House, Victoria Road, Woking, Surrey GU22 7PL.

12 NOVEMBER — CLINICAL WASTE: SAFE MANAGEMENT AND DISPOSAL

This course will deal with the legal situation, monitoring and control of incinerator emissions and the centralisation and changing management for disposal of clinical waste.

Venue: University of Sheffield.
Details: Mrs. K. Wainwright, CCVE, University of Sheffield. Tel: 0742 768653.

15 NOVEMBER — ENVIRONMENTAL AUDITING

The morning will deal with the nature of an environmental audit, examine the policy and regulatory framework and investigate the development of the audit in the US where the concept developed. The afternoon will see four case studies outlining how their environmental performance has improved through the use of the environmental audit and detailing methods and techniques used.

Venue: Inn on the Park Hotel, London W1.
Details: Liz Hide IBC Technical Services. Tel: 071 236 4080.

18 NOVEMBER — ENVIRONMENTAL LIABILITY IN BUSINESS: A CRITICAL COST CENTRE

UK businesses are increasingly being forced to pay serious attention to the impact of environmental liability in all their corporate transactions. This conference will examine the full range of potential liabilities that can arise and set out practical ways of managing them in the most cost effective way. Fee: £250 + VAT.

Venue: Meridien Hotel, London W1.
Details: Westminster Management Consultants Ltd, Westminster House, Victoria Road, Woking, Surrey GU22 7PL.

19 NOVEMBER — MANAGING ENVIRONMENTAL RISKS: THE PROCESS OF MINIMISING EXPOSURE

This conference addresses the whole range of management and handling of environmental risks, both major and minor, from understanding their nature and impact through to strategic planning, appreciating the human resources issues and coping with the consequences of media attention if the unthinkable occurs. Fee: £250 + VAT.

Venue: Churchill Hotel, London W1.
Details: Westminster Management Consultants Ltd, Westminster House, Victoria Road, Woking, Surrey GU 22 7PL.

20 NOVEMBER — TREATMENT AND DISPOSAL OF CHEMICAL WASTE

This course will review the current situation and indicate the direction of future policy and practice, and show how higher standards of disposal can be achieved on a cost effective basis. The course is aimed primarily at consultants and researchers, local authorities, the National Rivers Authorities and HMIP.
Venue: CCVE University of Sheffield.
Details: Mrs. K. Wainwright, CCVE, University of Sheffield. Tel: 0742 768653.

20-21 NOVEMBER — ADVANCES IN ENVIRONMENTAL AUDITING

Environmental auditing is carried out for a variety of reasons — to ensure compliance, reduce financial exposure, identify savings and most recently to gain accreditation of the environmental friendliness of the company. The methodologies used for these different types of audit vary enormously — by separating the audits by purpose this conference will allow the business advantages to be more clearly defined and prevent too generalised presentations which can become repetitive. Fee: £495 + VAT.
Venue: Portman Inter-Continental Hotel, London.
Details: Liz Hide IBC Technical Services Ltd. Tel: 071 637 4383.

21-22 NOVEMBER — MAKING ENERGY FROM WASTE PROFITABLE

This two-day conference addresses the myriad of complex issues facing the energy from waste industry today. It will cover in specific detail the technology, the economics and the environmental factors that you need to know before you hire costly consultants and sink your own time and money into feasibility studies. Fee: £816.63; local authorities — £640.38.
Venue: Kensington Palace Thistle Hotel, London W8.
Details: IIR Ltd. Tel: 071 412 0141.

20-21 NOVEMBER — INTEGRATED POLLUTION CONTROL FOR THE PROCESS INDUSTRIES

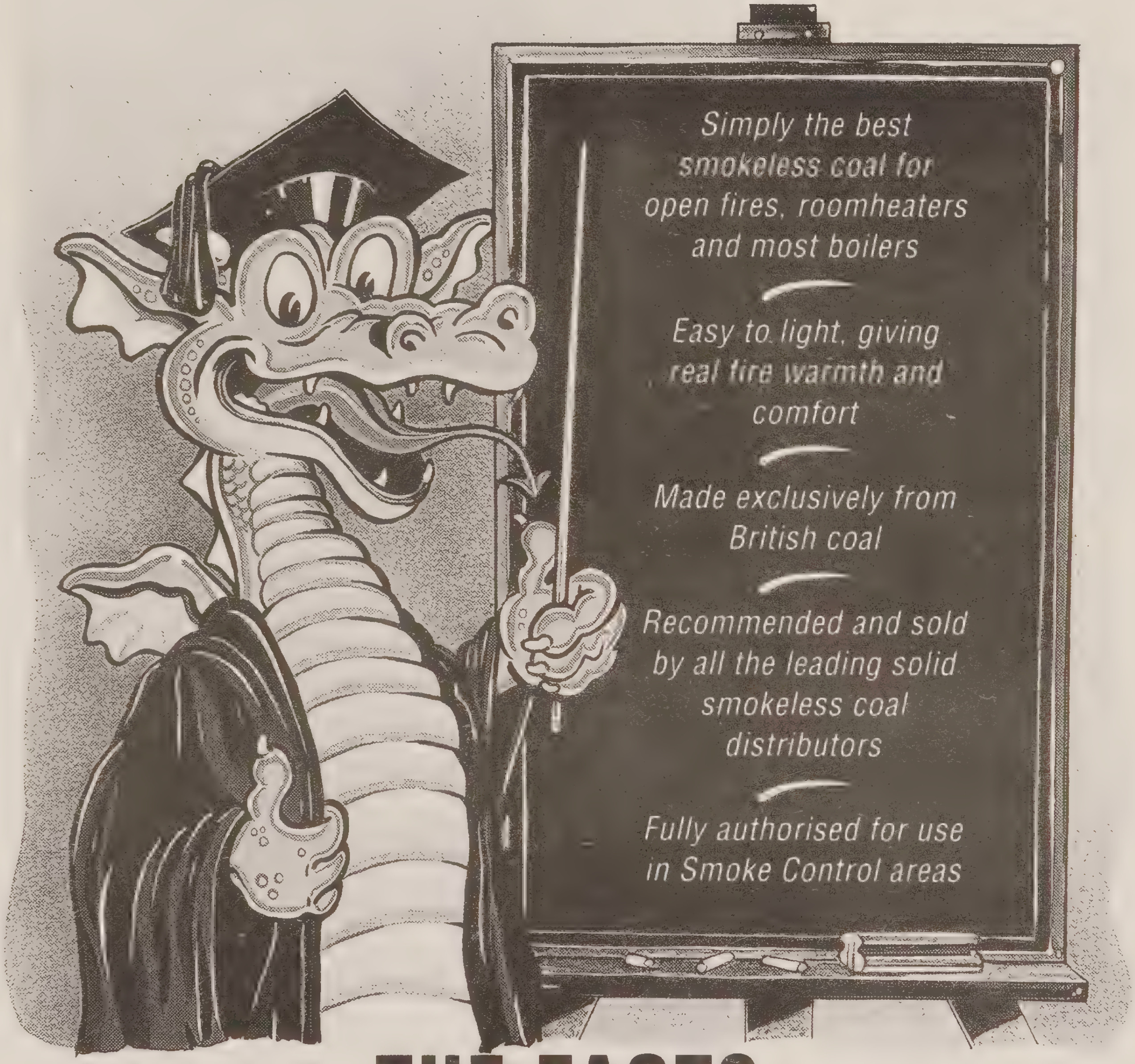
This conference aims to provide participants with a clear understanding of the new regulations and their implications for process companies.
Venue: Cafe Royal, London.
Details: Stephanie Holder, IIR Ltd. Tel: 071 587 1117. Fax: 071 587 3703.

25-28 NOVEMBER — COMMUNICATING ENVIRONMENTAL ISSUES

The course aims to provide up-to-date information and develop an overview of current environmental issues. Fee: £270; 50 percent subsidy for staff of local authorities and voluntary bodies.
Venue: Snowdonia National Park Study Centre.
Details: Margaret Griffith, Snowdonia National Park Study Centre. Tel: 0766 85324.

5-6 DECEMBER — EC ENVIRONMENTAL REGULATIONS AND DIRECTIVES

Latest developments, legal and practical considerations on EC proposals relating to waste, packaging, eco-labelling and environmental auditing. Fee: £734.38.
Venue: Scandic Crown Hotel, London WC1.
Details: IIR Ltd. Tel: 071 412 0141. Fax: 071 412 0145.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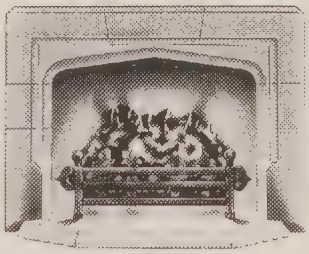

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CLEAN AIR

NATIONAL SOCIETY FOR CLEAN AIR
AND ENVIRONMENTAL PROTECTION

VOL. 21 NO. 4
WINTER 1991

NSCA 1992 WORKSHOP

AIR QUALITIY

Progress through Partnership?

24 and 25 MARCH
Lincoln College
OXFORD

Clean Air is an increasingly complex subject. Realistic debate must encompass new pollutants, indirect effects and economic appraisal so that the real costs of environmental impact can be counted. What are the issues and trends in air pollution control? How do polluters and regulators respond in the face of limited resources? And how do these concerns fit into the wider context of environmental accountability, auditing and management? We aim to supply some answers to these questions.

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NATIONAL SOCIETY FOR CLEAN AIR AND ENVIRONMENTAL PROTECTION

(Founded 1899)
Registered Charity, Number 221026

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EDITORIAL

THREE STEPS TO CLEANER AIR

"It was quite like old times" reported a cheerful leader in *The Times* as parts of the UK experienced the worst winter air pollution episode of recent years just before Christmas. This followed a summer where, with an increasingly well developed network for ozone monitoring, we enjoyed the cleanest summer air for twenty years. The difference between the old-fashioned and modern winter smogs is that, outside of isolated pockets of sulphur dioxide pollution, it is usually nitrogen oxides which push air quality into the Department of Environment's "very poor" category. NSCA fired off another round of letters to newspaper editors pointing out that it would have been helpful for the public to have been warned in advance of episodes instead of reading about the smog after the event. Indeed, following the excitement, *The Independent* has now joined *The Guardian* and *The Evening Standard* in reporting daily air quality readings and forecasts. Local authorities like Bristol and Sheffield are also issuing alerts based on their own monitoring via the local media. Our long-running campaign to persuade the media to cover air quality alongside weather forecasts is gradually bearing fruit.

Step One is to report and forecast poor air quality. Step Two is to provide the "so what?" information on health so that there can be informed debate about the need for more effective intervention. The Department of Health Advisory Group has already published its recommendations on ozone and a second report on sulphur dioxide is expected in the spring. The Department is now chasing up epidemiological data on mortality, hospital admissions and incidence of respiratory disease to see how it corresponds to the pollution levels measured during the December smog; we hope to hear the first results of this investigation at the NSCA Spring Workshop.

In the UK we have yet to take Step Three — action to control sources of pollution during episodes. But we understand that the Department of the Environment is giving serious consideration to the sort of powers that could be used during episodes. This winter for the first time DOE called for voluntary restraint on the use of cars — the main source of urban nitrogen oxides — and appealed to drivers to use public transport. Should this be extended into legal powers to control traffic and polluting industries? Or should we continue to gasp our way through the occasional episode accepting a marginal increase in danger to those already at risk from respiratory disease? We believe that the precautionary principle justifies further restraint on polluters; restraint which should only be relaxed on the basis of sound medical evidence.

ENVIRONMENTAL PROTECTION 1992

BOURNEMOUTH

19 - 22 OCTOBER 1992

CALL FOR PAPERS

The 59th NSCA Annual Conference and Environmental Protection Exhibition will be held in the Bournemouth International Conference Centre. Each year the Conference addresses a wide range of environmental issues, covering the fields of air pollution, noise, waste disposal, energy policy and more.

If you are undertaking research or have particular experience in environmental protection which could be of interest to a varied audience, you might like to consider presenting a paper to the 1992 Conference at Bourenmouth.

We invite potential authors to submit one-paged proposals summarising the scope of the paper along with its title, the name of the author, his/her affiliation and a contact address and telephone number.

Proposals should reach the Secretary General of NSCA at the address below by 1 March. Authors will be notified in April.

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NSCA NEWS AND VIEWS

PRESIDENT'S ADDRESS

ANNUAL CONFERENCE 1991

SCIENCE, EDUCATION AND THE ENVIRONMENT

Baroness Platt of Writtle CBE

I read a prospectus for a graduate engineering course in Sheffield which said, among other things: "It's not unusual for engineers to be faced with a task which seems to demand far more knowledge, skill and experience than they possess, and this is the situation you will be in." That's where I find myself today.

I am eternally grateful for being broadly and well educated at school, with a strong emphasis on science and maths, as well as modern languages, modern history and comparative religion, to prepare me to accept a place at Cambridge to read engineering during the war. In those days that was almost unheard of; we were five girls amongst 250 men, and there had only been nine ever before. After that I worked on the shop floor of an aircraft factory, then in the experimental flight test department of Hawkers, developing fighters which helped to win the war, and later in the research and development department of an airline on air safety.

All these experiences prepared me well for the problems of life, including 25 years in local government, where problems never come in single subjects. They are always multi-faceted, affected as much by the human aspects as the technological ones. Without my engineering background, too easily I could have been blinded by science, or put off by "technofear", so that I would not have carried out my duties properly, in positions of considerable responsibility. My theme today is therefore that we need every man, woman and child in this country to have a firm basis of science and technology in their early education, as well as a broad knowledge of human problems, so that they are able to make balanced judgements about the concerns of this Society, during their lives.

The NSCA has been in existence nearly a hundred years, started by those forward-looking founding fathers who wanted to awaken public opinion to the importance of clean air and control of environmental pollution. Today in our increasingly crowded globe, those aims have become even more vital. Global warming, acid rain and other major industrial factors could threaten life itself on our planet, and time is running out. While those founding fathers could not have imagined that, their sensible aims laid the foundation of a forthright and well informed National Society well placed to take on the problems of today, and to press for action.

The Society's Memorandum of Association records among its objectives:

> ". . . to initiate, assist, promote and encourage the investigation, consideration and discussion of all forms of pollution in order to achieve its reduction or prevention. . ."
>
> ". . . to promote public education in all matters relating to the value and importance of clean air, and methods and consequences of air pollution control and other forms of pollution control. . ."

Central too is the Society's recognition that the nation earns its living in a highly competitive industrial world, requiring that it comes to terms with those commercial and industrial pollutants which are concomitant with its lifestyle. All can be controlled, but at a price. However, the fact that the costs are charged to a set of accounts which bear directly on the pocket of the tax-payer and the consumer, while the benefits are often intangible and delayed, means that the politics of pollution control can centre almost exclusively on how the bill is to be paid this year. But important though money undoubtedly is, this should not be seen as simply a question of cash. In tomorrow's society when "sustainable development" will have become the watchwords, the price is also going to involve fundamental changes in the way we live. Convincing our consumer-orientated society of this, clearly demands an informed public capable of recognising and controlling its own extravagant consumption of finite resources. It must also recognise that pollution is only one component of the inter-related problems facing mankind which cannot be studied in isolation.

These problems are manifold — waste of finite resources, population growth, economic performance, unemployment, poverty, forced migrations, the legacies of the Gulf War — all have a global impact and therefore impinge on us directly. Indeed, this is what next year's Earth Summit Meeting in Rio — the UN Conference on Environment and Development — will be discussing, and not before time.

Thus the last few years have seen an explosion of public interest in environmental issues. While this is welcome it has also been characterised by a great deal of misunderstanding. For instance, there are motorists who think that using unleaded petrol saves the ozone layer. Our country has led the world in the provision of public education, but it has often been insufficiently scientifically and technogically based. This has resulted in some pressure groups being able to feed the media with over-sensationalised campaigns, and the public not being sufficiently well qualified to exercise the necessary balanced criticism of the reports. Manufacturers have leapt aboard the green bandwagon selling products which claim to help the environment. It is very difficult without proper in-depth information to judge whether this is really the case in the long term. The result is a public which, having taken an interest in the environment, is justifiably suspicious that it may be being manipulated by scaremongers or exploited by marketing people with an eye for a new product niche.

It is essential therefore that we maintain the public's concern about the environment, and give them the ability to know when the wool is being pulled over their eyes, to make informed and intelligent judgements about environmental issues, and to view environmental threats in proper perspective. Without an informed public pressurising their politicians, environmental issues may slip down the agenda, or alternatively be hijacked by specialist lobbyists, and inappropriate policies developed.

That brings me back to my basic theme today of an improved scientific education for all — children, men and women, in all walks of life from the shop floor and the customer at the supermarket right up to the boardroom, the professions, Parliament and the media. No-one can be left out. Often in the past they were, with far more concentration in schools and universities on the humanities, leaving the sciences and the application of technology only to the "rude mechanicals". Science and technology did not need to bother the head of the lady, the gentleman or the truly educated academic. We therefore were led to treat them with disdain, with disastrous effects on policy decisions later on, as they were made on partial information only.

Enormous strides have been made in the last few years in the range of issues being taught today and the way in which this is done. Children are encouraged to be more enquiring and questioning and to carry out projects of a practical nature, which will clearly benefit them later on, preparing them to take the decisions which will face them both personally and collectively in their adult lifes.

The NSCA deals with tens of thousands of enquiries every year — even young children barely able to write have become seriously worried about the issues. It is clear that environmental studies are now part of the National Curriculum in a number of main subject areas — geography, English, chemistry, etc so that children's education is now automatically broader and less compartmentalised. Science and technology are now amongst the core subjects in the National Curriculum. This must benefit children in gaining deeper understanding of the inter-related nature of a wide variety of stresses put on the environment, and the effects of particular courses of action, and whether they will lead to the solution of the resulting problems, or indeed in the long term make the problems worse.

The Engineering Council, the Association for Science Education, The Standing Conference of Schools Science and Technology and many others have set up technology projects to inspire young people to take up the challenge of solving problems which inevitably arise when working altruistically to help other people, which children very much enjoy. The example I am going to describe is one of thousands. This arose from a project backed by the Nuffield Foundation and Professors Black and Harrison, who set up the Technology Education Project.

It is the Peruvian Water Project run at Deyes High School, Sefton, with third year pupils. The idea was sparked off by some material from Christian Aid, drawing attention to the problems of water shortage in a Peruvian village. The scope was wide, and a number of departments became involved: RE, science, English, art, geography and craft, design and technology. All have expertise to offer and could tackle various aspects of the project. The normal timetable was suspended for three days and the pupils, placed in small groups, were presented with the same brief: to suggest ways of solving the water shortage problem. The eventual outcome was a proposal for a reservoir. The groups then looked at the implications of their decision. Some looked at testing water pressure, others at porosity of soils, water purification, hydro-electric power, etc. Role play was used to help the pupils understand the problems of the village.

In this way, the pupils were led into diverse problem areas, often requiring them to identify (with appropriate guidance) the knowledge and skills necessary to produce solutions. They found that they not only had to acquire new knowledge and skills but they had to call on existing knowledge hitherto unutilised; and before they could use this existing theoretical knowledge, they had to transform it into a practical form. Moreover, they often did not realise that problems existed until they had been prompted by staff. Solutions to problems seemed easy until the consequences of their decisions were pointed out. What were the social implications of flooding someone's home to provide water for others? Then pupils had to balance one option against another, in the same way as decisions are made in the real world. They had to consider those options mathematically and rigorously, so they could not jump to a facile and inaccurately based solution.

The students recall the project with enthusiasm. They felt they had used real knowledge to solve real problems. In the course of their work they had come across many incidental problems all of which had to be solved in order to proceed. They gained insights into the difficulties facing poor countries, and had also developed skills of communication and research. This example, I think, vividly describes the broadminded and rigorous approach we must wish to see encouraged in both primary and secondary schools.

Local management of schools is the order of the day, and governors with an interest in the sustainable environment can raise the question at meetings to ensure that the subject is being considered in depth.

Another important related subject is energy efficiency. When I was Chairman of Education and later Chairman of Finance in Essex we initiated a powerful energy saving campaign, including the following features:

- placing it on the curriculum so children were well prepared later for saving energy in their own homes and work situation;
- training caretakers in energy saving and proper use of boilers;
- encouraging Heads to organise the use of their schools for adult education in an economical way;
- enlisting the help of Cranfield Institute in the use of computer-aided controls;
- engendering wide ranging personal responsibility for turning off lights, closing windows, at all levels including children;
- in-service training of teachers;
- the County Architect's Department were given permission to initiate capital projects in county establishments which would repay the investment in three — later five years.

As a result we saved £33m gross, (£26m nett) over a period of ten years. This was a real economy and could be reallocated to such worthwhile uses as improving teaching staff ratios, expenditure on books, etc. We also — although we did not appreciate it at the time — substantially reduced the release of large volumes of CO_2 into the atmosphere which would have contributed to global warming. This was a very valuable project which, on a smaller scale, could be copied by individual schools. In Essex there is still an energy-saving adviser to help to develop initiatives of this sort. I do believe world wide energy saving is of great importance in the control of global warming. Each country should look with sharp self-criticism at its use of energy, and promote all sorts of initiatives leading to economy.

If these ideas are to put over with enthusiasm in schools, teachers must be confident of their ability to explain technical and scientific principles, and to lead discussions amongst their pupils as to why some apparently attractive solution will not produce the required results in the long term. That needs a very confident scientific base in the teacher's mind. Many teachers were admitted to training college, pre-1970s, without even an 'O' level in maths and English — let alone science and technology. They must have strong, in-service training if they are to cope with children's questions with confidence, and feel sufficiently relaxed to make the lesson fascinating, and therefore fun for the children.

You will expect me to promote the WISE campaign (Women Into Science and Engineering). Too often in the past people have regarded these subjects as confined to a man's world and girls have been actively discouraged from entering a career in science and engineering. In 1984 the Equal Opportunities Commission, of which I was then Chairman, decided that literally half the talents of the nation were being neglected in these fields. The Engineering Council, of which I was at that time the only woman member, firmly decided that we must encourage more women into our profession. I am glad to say that seven years later the WISE campaign still continues with considerable support from Government, schools, colleges and universities. Industry, sharply aware of the demographic trends which will reduce the number of 18 years olds from 900,000 in 1981 to 600,000 in 1995 — a dramatic drop of a third — is also very supportive, and actively recruiting young women scientists and engineers. The percentage of women first year undergraduates in engineering has more than doubled as a result of the WISE campaign from 7 per cent to 15 per cent. In chemical engineering as many as 25-30 per cent of first year undergraduates are women. It is pleasant to record success, but that certainly cannot lead to complacency. If women are really to be knowledgeable in science and engineering the campaign must certainly go on until the end of the century.

Because of the long standing tradition of science and technology being a man's world, girls and women have tended to switch off at the very mention of these subjects. If we want to see a better educated public in these matters everything we do for men and boys needs to be even more attractively put over to women and girls if we are to harness their enthusiasm and overcome the neglect of centuries. The Committee for the Public Understanding of Science, backed by the British Association, the Royal Society, and the Royal Institution is putting this policy into effect. As a result the Women's Institute at Denman College is going to run a course for County members and introduce the ideas into other courses, so as to awaken interest in the subject amongst its members, which of course include mothers and grandmothers, so new attitudes can be communicated to girls of future generations.

We need far better-informed articles in newspapers and magazines. The specialist scientific press already does that, but usually in a way unlikely to appeal to the non-technical members of society. It is very difficult to put over highly technical subjects in an attractive way, and one which is easily understood by the general public. Sir John Mason, your former president, has that talent in great measure, but he is a rare bird. Professor Heinz Wolff does wonderful work with children in schools, and Sir Walter Bodmer and Sir David Attenborough to wider audiences. The Faraday Lectures promoted nationwide by the Institute of Electrical Engineers are excellent, and entrance their audiences of secondary schoolchildren. The Engineering Council through its publication "Engineering is for people" with its emphasis on the importance of engineers caring for the environment, and its launch of the neighbourhood engineer scheme is doing a very good job. Over five years they are hoping to attract about 24,000 engineers, including women, on a voluntary basis to form close relationships with all secondary schools, to put over the attractive and humanitarian nature of a career in engineering for boys and girls and to help them set up and investigate the sort of scientific and engineering based projects I have mentioned. The Association for Science Education over the years has pursued similar initiatives in schools, especially emphasising the inter-relationship of science and social issues.

Last but by no means least, NSCA itself issues excellent teaching materials for use at all levels in schools, and amongst adults, to encourage interest in clean air and environmental protection. I am greatly in favour of these sorts of initiatives which forward the aims of the Society at grassroots level, which in the long term is where the aims of NSCA must take root if we are to be successful in sustaining our environment successfully in the future. Again, stimulating talks by members in schools and to women's groups will be of immense value, if they then adopt the subject as one of interest to children in their social and family life. We need people to mind so much about their environment that they are prepared to make an effort to understand the underlying problems so that they can take personal action to protect and sustain what is for them — and us — the essential backcloth of everybody's lives. That will mean making a definite effort to control any form of waste and to collect and sort all the multifarious packaging, bottles, paper, aluminium, and make them available for recycling. It will mean saving energy, insulating their homes, perhaps installing solar energy panels, turning off switches, buying environmentally friendly fuels, deciding wherever possible not to take the car. It will entail reading the small print on the aerosols, the green products, the recycled paper, watching the TV adverts and reading the newspapers critically, so that individually they can act in as benign a way as possible towards the environment. Every effort must be made in the industrially developed world, where we are extravagant in the use of fuels and materials.

Different but equally strenuous efforts need to be made in the developing world to provide pumped clean water to villages, to provide, perhaps through the use of solar energy, much more environmentally friendly methods of cooking. The present ones burn down forests and are very wasteful in energy, contribute to global warming, and result in a life of drudgery for women, whose talents could be much better used than in everlastingly collecting wood and water. The World Bank could very profitably invest in intermediate or appropriate technology, which could enable the Third World to purchase cheap mass produced modern appliances which are at the same time environmentally friendly.

The NSCA has always based its raison d'être on public education so that the public would then demand government action, whether in terms of legislation, enforcement, or encouragement of good practice, in the control of the environment. That entails decision making at high levels, whether in Parliament, industry or commerce. From that viewpoint, it is even more important that the potential opinion formers, who will probably be graduates or professional journalists, lawyers or accountants, should have as well as their professional training, a good understanding of science and technology. Science and technology are of their very nature fast-moving in their development of new knowledge and its application to new processes. That means that these leaders need continuing education to keep them up to date.

I should like to emphasise here the particular responsibility of the media; newspapers, radio, and television are all major opinion formers. They too need to understand and keep up to date with the applications of science and new technology even if their original studies were in English literature or economics. Too often people will automatically assume that because they've heard or read something in the media, it must be true. That is why it is so important for the media to carry accurate and balanced reports.

The public at its most cynical can regard engineers and scientists as the cause of all their troubles without realising that their whole lifestyle and health depends on these professionals' ingenuity over the years. Where would we be without roads, bridges, railways and aircraft — even the bicycle — household equipment, telephone, radio or television? Life without these things would be impossible in the developed world today. It is no good thinking nostalgically we can put the clock back to the dark ages of the first millennium — we certainly would not have developed clean water systems, control of sewerage, means of refrigerating food, knowledge of anatomy and physiology and resulting medical progress, without scientists and engineers, and our health would be incomparably worse without their inventions and discoveries and the applications of their discoveries by doctors and nurses. Engineers and scientists themselves need to keep up to date with new technology so that they can apply the new developments in a benign way, and the Engineering Council with help from the DTI is currently promoting continuing education and retraining of engineers throughout their careers.

The Engineering Council at last year's assembly decided to put over the idea of environmental control as a prime duty of engineers, and is continuing to offer prizes to commerce and industry and to young people for good ideas and their application in this field. Engineers and scientists need to be seen as saviours of the environment, and to exercise their technological judgement in a moral way, so as to do their utmost to sustain our environment for future generations.

These sort of ideas need also to be exercised in the boardrooms of the world, so that control of pollution to air, sea and land, energy saving, recycling of materials, safe waste disposal, etc is brought in at an early stage in decision making, and not as a cosmetic afterthought when the main plan has been decided. The board itself not only needs accountants, it must be properly advised by professional and up to date engineers and scientists, exercising their ingenuity with imagination and integrity, if it is to come to the sort of responsible decisions we require.

All these decisions, if environmental factors are to be taken into account properly, All these decisions, if environmental factors are to be taken into account properly, may entail extra cost whether from Government or industry and commerce. We shall pay, whether through taxes or the raised prices of the products we want to buy. Careful calculations have to be made of risk assessment. How likely is the fatal accident, the escape of effluent into the air, or nearby rivers? How can energy saving, or perhaps burning of waste in a controlled way actually save money over the years? All this development will affect boardroom decisions, and needs to be thought out equally ingeniously in local government. Enforcement carried out in an unimaginative sledgehammer way can only cost the consumer more and more, or worse still put the local firm out of business, with a loss of local jobs and the trade transferred elsewhere, perhaps outside this country. We live in a highly competitive world and will not benefit from being hamfisted, when other nations exercise quality control so imaginatively. Local government members and officers themselves must avoid bureaucracy, and try to find local mutually acceptable solutions to the problems presented. That will involve in-service training with local government itself, to engender more flexible attitudes than have often been apparent in the past.

My main theme today is one of education for men and women at all levels of society, and from the cradle to the grave, so that environmental decision making will be of good quality and firmly based on fact. Always judgement, imagination, ingenuity and flexibility will be demanded in arriving at responsible policies, but these policies will be better if based on factual information rather than hunches. NSCA has taken public education as one of its aims since its foundation. That aim does not become less important as the years go by, rather it becomes even more paramount as the quantity of technical and scientific knowledge accelerates ever more steeply, and its application becomes more complex and difficult to assess. At least we are a well established democracy with a long history of public participation and education, so the new developments required are achievable. We must set ourselves a target to see a measurable development in public understanding of science and technology by the year 2000 — the end of the second millennium. Time is running out, so we must get on with the job as quickly as possible.

CONFERENCE ROUND-UP

Over 300 people attended the NSCA's annual conference held in Eastbourne from 21-24 October. The opening address which was given by the Society's new President, Baroness Platt of Writtle is reproduced in this issue of *Clean Air*. Despite the shortcomings of the conference facilities at the Floral Hall, delegates enjoyed a full and varied programme and exhibition.

European Policies

The keynote address on the first morning was given by Lord Clinton-Davis, formerly a European Commissioner and now consultant on European law with solicitors S.J. Berwin and Co. In his address he explained the principles underlying the European Community's environmental policy and he stressed the importance of Britain playing a full and positive role in the development of EC policy.

Dr. Graham Bennett (Institute for European Environmental Policy) discussed the future shape of environmental policy following completion of the European single market at the end of 1992 and moves towards economic and monetary and political union. Further integration, he said, would infer a more prominent role for the EC in many areas of policy, not least environmental protection. Leaving Member States to impose differing standards of protection while still complying with EC legislation was incompatible with the objectives of the single market. He reminded delegates that Member States had committed themselves to shared responsibility, more cohesion and cooperation in the field of environmental policy at the 1990 Dublin summit. The 5th Environment Action Programme due out early in 1992 would show to what extent this commitment was translated into clear objectives. A further point of interest would be the extent to which environmental objectives were integrated into other policy sectors.

Sulphur dioxide, NOx and VOC emission reductions agreed under the Convention on Long Range Transboundary Air Pollution have, up to now, been negotiated on a source-oriented or technology-based approach. Future emission reductions are to be based on the critical loads approach. This approach, explained Dr. Dick Derwent (DoE Air Quality Division), was based on a quantitative estimate of an exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur. Following extensive research, critical loads maps were now being prepared across Europe. The DoE has established a National Centre for Critical Loads Mapping and maps for soil and freshwater acidification for the UK were published in 1991. These maps, together with similar ones being prepared in other European countries, would form the basis of discussion for the new UN-ECE agreement on SO_2 which it was hoped would be ready for signature by late 1992.

A Breath of Fresh Air — A Basic Human Right

Should our desire for freedom to use our car whenever and wherever we want take precedence over the need (and equally our desire) to reduce pollution given that much of that pollution comes from the increasing number of cars on our roads. Dr. Malcolm Green (British Lung Foundation) said that 1 in 10 children now suffer from asthma; while the exact cause was not known, it was probably fair to attribute at least some of that rise to increased pollutants. Dr. Green highlighted the importance of more information to the public and the need to make people aware of the importance of clean air and the effects of air pollution; people should also be aware of the existence of monitoring stations and information on pollution should be easily accessible. However the public should also be more forceful in saying that they neither want nor like pollution — for example the masks now being worn by many cyclists in London were not only protecting their health but also gave motorists a powerful message that cyclists don't like the pollution from their vehicles.

Public involvement in helping to deal with pollution was also a feature of the Kirklees smoky vehicles programme. Modelled on a similar programme in Australia (see *Clean Air*, summer 1990), members of the public may report excessively smoky vehicles to the environmental health department; complainants must give details of the registration number and type of vehicle, location, date and time of when spotted; no anonymous complaints are accepted. Ownership of the vehicle is then established through the DVLC and a standard letter sent to the owner, together with an advice leaflet listing common causes of excessive smoke and action on dealing with the problem. A follow up questionnaire is sent asking people what action they took as a result of the letter and whether they thought such notification useful. As at the end of October 1990, there had been 299 complaints for which the biggest single category were cars. The success of the scheme will obviously depend on continuing public involvement and information about the scheme is available at public information points in Kirklees.

Limiting car use as the sole means of dealing with pollution and congested roads would be an infrigement of people's personal freedom and would not necessarily solve the problems. What was needed, said Jeremy Vanke (RAC), was an integrated transport system which took into account not only all the different ways of getting about, including walking, cycling, cars and public transport, but also land use policies and planning. There would always be journeys for which a car was the most sensible mode of transport, but by offering other options, people would have genuine freedom of choice and the environment would benefit.

Despite their increasing use in California, Dr. Claire Holman did not see electric cars as having a similar future role in the UK. For one thing, they could lead to increase NO_x and SO_2 emissions as electricity in the UK is substantially coal generated. Instead more effort should be put into developing alternative techology, such as making petrol more efficient and in looking for new ways to use conventional technology — e.g. smaller fuel efficient cars driven less often.

Noise

Any thoughts of taking a quick "forty winks" during the noise session were quickly dispelled by David Romaine's practical demonstration of what he meant by a noisy party! In this instance a noisy party was defined as a big pay party or acid house party lasting much of the weekend. Although it was noted that even once-off private parties can cause just as much nuisance to those neighbours who have not been invited. A proposal that there should be a new offence of night-time nuisance generated considerable interest. This, it was suggested should be given the same legal status as breach of the peace, thus enabling the police to arrest those responsible (following confirmation by an EHO that the noise amounted to a nuisance).

Some were of the opinion that while liaison and cooperation with the police were welcome, they should not be involved in otherwise dealing with something that was the responsibility of EHOs and for which current legislation provided them with powers for abating noise nuisance. On the other hand, in areas such as Lewisham where 10 per cent of the population is beleaguered each week by blues parties and there are up to 20 pay parties each week, a more robust approach — including police help — was needed.

What was clear, however, was that in many areas, the number of noise complaints now being received by EHOs was severely stretching their resources, particularly now that the *Environmental Protection Act 1990* imposes a duty on them to inspect all reasonable complaints. In order to help this situation, NSCA's National Noise Committee has drawn up some guidelines for local authorities on dealing with noise complaints which were launched at the conference. The guidelines (see this issue of *Clean Air*) are intended as a minimum standard of response to complaints and enforcement in England and Wales of the statutory nuisance provisions of the EPA.

Geof Kaufman, NSCA's representative on the Government's Noise Review Working Party which reported in October 1990, summarised the report's recommendations and what had happened as a result. He said that of the report's 53 recommendations, 3 had been fully implemented by July 1991, and there was general agreement on complying with a further 17. The Government had yet to comment on 31 and were opposed in principle to 2. He felt that the Government had made a positive step towards recognising the aims and aspirations of the Working Party: the Government had stated a first policy initiative of protecting people from direct damage to their health from noise and their second priority was to protect people from noise nuisance as far as they could without interfering with personal freedom. Mr. Kaufman hoped, however, that the Government would recognise its responsibility and avoid any unnecessary delay in introducing legislation, guidelines and codes of practice and provide sufficient resources to those who have the responsibility of protecting the environment and thus of putting into practice the Government's stated priorities.

Local Authority Air Pollution Controls

It was suggested that insufficient publicity could be major factor in explaining why so few processes prescribed for local authority air pollution control under the EPA had applied for an authorisation within the required timescale. In a survey carried out by the Association of Metropolitan Authorities (to which 39 authorities responded), well under half the expected number of applications for Block 1 processes (applications required between 1 April and 30 September 1991) had been received by the deadline. As at 11 October only 5 authorisations (all for waste oil burners) had been issued — 4 by the same authority. Despite this apparently worrying situation, it was noted that it was still early days and Mr. Stephen Carden said he believed that there was much in the new legislation which was good and that it must be given a chance to work. However there were real concerns as to whether local authorities had sufficient resources to carry out their new duties — not just in terms of staff, but also money. The AMA's survey confirmed that local authorities are having to absorb the start up costs of the new system and that no additional revenue monies had been provided to assist with training, equipment purchase and "seek and find" operations to identify processes.

Tackling Waste Disposal

As a result of implementation of Part II of the *Environmental Protection Act,* waste disposal, handling and management in the UK will be significantly changed over the next few years. Some waste disposal operations, e.g. incineration will require either HMIP or LA authorisation under Part I of the Act. The Act also required recycling plans to be drawn up. The NIMBY syndrome — Not in My Back Yard — was proving a major problem in getting approval for new waste disposal projects: new landfill sites were becoming increasingly scarce and most people were still deeply suspicious of incinerators. All these issues were discussed during the waste disposal session and once again the need for a better informed public was highlighted — both to improve the reputation of different waste disposal options and to encourage participation in recycling schemes. On this latter point, however, more attention needed to be put into developing a market for recycled materials — people won't bother to take part in recycling schemes if they then find out that the stuff ends up on a landfill site.

An Informed Public

The final session returned to the theme of education to enable the public to make balanced judgements on environmental problems with which Baroness Platt had opened the conference; papers looked at the way environmental issues and pollution are dealt with in schools and other adult education initiatives. There was consensus that children and adults must be encouraged to develop relevant skills which can be used to build up "environmental literacy" and thus the will and confidence to act towards the resolution of future issues.

Conference Papers

The papers presented at the conference are being finalised for sending to all delegates. They will also be available for purchase at £2.50 per paper or £19.50 for the full set.

ANNUAL GENERAL MEETING

At the Society's Annual General Meeting held on 21 October 1991, Sir John Mason handed over the Presidency of the Society to Baroness Platt of Writtle. Sir John, who became President in October 1989, said how much he had enjoyed his term as President and that, in particular, it had given him great pleasure to be involved in the re-emergence of the Society's Scottish and Northern Ireland Divisions. The expansion of the Society's activities into all aspects of environmental control was also to be welcomed as was its continuing role in providing well researched and balanced educational material. This latter area is of particular interest to Baroness Platt who has been involved in a number of projects aimed at raising awareness among all sectors of the community that solutions to environmental problems must be based on accurate science — (see this issue of *Clean Air*, Science, Education and the Environment).

At the Annual General Meeting, members passed a resolution increasing the number of Vice-Presidents and subsequently elected the Society's retiring Secretary-General, Air Commodore John Langston, as a Vice-President.

Five longstanding members of the Society were elected Honorary Members: Max Beaumont was Chairman of the Society in 1985/86 and represented the London and South East Division on the National Council for many years. James Clancey, also a member of the London and South East Division was chairman of the Society in 1975/76. Kenneth Enderby is a member of the East Midlands Division and has represented Peterborough City Council on the NSCA for over 20 years. Professor Richard Scorer, also a representative of the London and South East Division was Chairman of the Society in 1979/80. Finally, Harry Thomas of the South and Mid-Wales Division was a member of the Society's Conference and Promotions Committee for many years. To all of them, the NSCA extends its thanks for the many hours of work they have put in on the Society's behalf.

The name of Cllr Len Poole will be familiar to many members of the Society. Len has been a firm supporter of the NSCA's work for many years and the Society can count itself lucky to have had (and to continue to have) the benefit of his wise counsel; Len was President of the Society from 1985-87, and Chairman of the Council for the year 1984-85. He is also Chairman of the Society's Northern Division. Len's many activities and appointments in Middlesbrough are too numerous to mention here!

However, as Len is well aware, his ability to lead such a busy life of public service would not have been possible without the support of his wife, Mary, who sadly died in 1990. In recognition of his wife's support Len has presented to the Society two commemoration medals which will be presented each year to the companions of the Society's President and Chairman. On behalf of the Society, Jane Inglefield thanked Len for his generous gesture which was much appreciated.

OFFICERS OF SOCIETY 1991/1992

At the meeting of the Council held on 21 October, Cllr Mrs Jane Inglefield was elected Chairman. Mr. Jim Harrison was elected First Deputy Chairman and Mr. Geof Kaufman Second Deputy Chairman. Mr. Brian Edwick was re-elected Hon. Treasurer.

(back row) Bill Snow, Frank Shephard, John Langston, Tom Crossett, Jim Harrison.
(front row) Sir John Mason, Baroness Platt of Writtle, Cllr Mrs Jane Inglefield

AIR COMMODORE JOHN LANGSTON

Prior to its December meeting, the Council held a reception in honour of John Langston who retired at the end of 1991 after 11 years as Secretary General of the Society. In thanking the Council for their gift of a barograph, John said how much he had enjoyed working for the Society and he thanked the members of the Council and of the committees for all their hard work on behalf of the Society; their commitment to the aims and objectives of the Society and the enormous expertise they represented ensured that the Society's views and policies were based on sound scientific fact all of which enhanced the Society's reputation. John added that he had never met a member whom he did not instinctively like, or been required to press a cause with which he could not personally identify!

John will not be relinquishing all his connections with the Society — as well as his election as a vice-president of NSCA, John retains his honorary appointment as Director-General of the International Union of Air Pollution Prevention Associations. He was also elected Chairman of the Investigation of Air Pollution Standing Conference (IAPSC) in December.

Sir John Mason, Cllr Mrs Jane Inglefield and John Langston

1992 NSCA POLLUTION HANDBOOK

The annual NSCA Pollution Handbook is now firmly established as the best all-round guide to UK pollution law and practice. It is widely used by central and local government, industry, pollution specialists, researchers and students. Anyone with an interest in the environment will find in at invaluable source of information and data.

The 1992 edition has been substantially revised, with main sections covering air, noise, water and waste pollution. All relevant UK legislation and EC Directives are described, including the Environmental Protection Act 1990, its subsequent regulations and implementation timetable. The Water Resources Act 1991 and the Water Industry Act 1991, consolidating water pollution legislation, are also covered and all other sections of the Handbook are updated to December 1991.

390 pages, A5, soft covers, £17.95 inclusive of postage and packing

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SOUTH EAST DIVISION

At the annual general meetings of the Division held in June, Mr. Paul Cooney was elected Chairman, Mr. F. John Smith, Deputy Chairman and Mr. Joseph Beagle, Hon. Secretary. The Division thanked Mrs. Pat Naylor, who was retiring after eight years as Divisional Chairman, for all her hard work on behalf of the Division. Following the meeting Mr. George Vulkan (Rendel Science and Environment) addressed the meeting on the problems of pollution in Eastern Europe. The Hon. Secretary also reports that on a recent holiday in Czechoslovakia he addressed environmental academics at the Institute of Chemical Technology on the subject of pollution problems in the UK.

At the annual general meeting of the National Society held in Eastbourne in October 1991, the renaming of the Division as the South East Division was confirmed.

On 26 November 1991 at the Institute of Child Health in London the Division held a one day seminar on the “Environmental Impact of Transport in the South East”. It was attended by over 55 delegates who enjoyed a well balanced programme with nine expert speakers. The key speaker Patrick McLoughlin MP, Under Secretary of State for Transport, stated that although car traffic would double with national prosperity by 2015 the UK would still possess fewer cars for the size of population than many other European countries. It was not government policy to tell people where and how they should travel. New roads would only be built if economic and environmental considerations were favourable. He cited the M25 as an example where freight traffic through London was reduced by 20 per cent. Cars would have to be made more environmentally friendly.

This was at variance with some of the speakers who thought that new road building alone would only exacerbate the problems both in town and in the country. Restrictions in road traffic growth were essential if pollution levels were to be reduced substantially, especially CO2. Noise and pollution from road and air traffic caused special problems as road and air travel increased and would have to be resolved.

One answer could be an Integrated Transport Service utilising the best available technology in road and rail travel. Light railway links could serve large conurbations reducing the amount of motor vehicles. High speed passenger and freight trains such as envisaged for the Channel Tunnel rail link were equivalent to several motorways and would lessen pollution and improve the environment. All speakers were agreed that restricting the use of road vehicles would be most beneficial not only by reducing pollution but by improving the quality of life. *(Received from Joseph Beagle)*

JAMES CLANCEY OBE BEM AFIWEM FRSH

It was with deep regret that the Society learnt of the death of James Clancey on 13 January 1992 following a long fight against cancer.

Jim Clancey, who had been a keen supporter of the clean air movement for over 40 years was made an Hon. Member of the Society at its AGM last October. He represented the South East Division on the National Council for many years, and was Chairman in 1975-76.

Before retirement, he was Chief Inspector (Environmental Health) to the GLC and prior to that, Chief Inspector in the Public Health Department of the London County Council. He was a past Vice-President of the Institution of Public Health Engineers and of the Institution of Environmental Health Officers. He was also an Hon. Fellow of the Institution of Water and Environmental Management and an Hon. Fellow and life Vice-President of the Royal Society of Health.

The Society was represented at his funeral by Air Commodore John Langston.

LONDON SMOG

Nitrogen dioxide levels reached 293 ppb in London on Friday 13 December — the highest level since records began in 1976, resulting in comparisons with the great London Smog of 1952. In 1952, however, sulphur dioxide from coal burning fires and factories was the main culprit and was thought to have been directly responsible for an additional 4000 deaths over the period. On this occasion pollution from car exhausts was the main cause of the problem which was exacerbated by the freezing cold temperatures and lack of wind which trapped the pollutants at ground level.

NSCA and other environmental groups have for many months being trying to encourage the media to carry regular reports on air quality — in the same way that weather forecasts are published. However, with the notable exception of *The Guardian*, the *London Evening Standard*, BBC Ceefax and a number of local newspapers, most appear to take the view that "ordinary" (i.e. good or very good) air quality is not newsworthy.

Thus it was that we were encouraged by the front page coverage of the recent air pollution episodes accompanied by exhortations to motorists to leave their cars at home, asthmatics to stay indoors and to joggers not to jog in the smog. However, how much more sensible it would have been if the public had been given advance warning of the episode and advice on the action to take. From telephone calls to the NSCA it is clear that the public is becoming more aware of air pollution and the part that they can play in reducing it. NSCA has again written to national newspapers asking them to publish the daily air quality bulletins which are issued by the Department of Environment.

So far as our major cities are concerned they make like to copy the example of their international cousins, such as Sao Paulo, Seoul and New York where up to the minute data on air quality is given on electronic signs at the kerbside. In Sao Paulo, where electronic data on pollution levels has been available for some time (and regularly records bad or very bad air quality), there has been widespread public cooperation in reducing car use and altering working hours when the pollution forecast is bad.

CODE OF GOOD AGRICULTURAL PRACTICE

The Ministry of Agriculture, Fisheries and Food is currently finalising a Code of Good Agricultural Practice for the Protection of the Air. It summarises some of the legislation of which farmers should be aware and gives practical guidance on reducing the problem of odours, minimising the need to burn waste and other materials. It also outlines alternative uses for straw and describes ways of reducing emissions of ammonia and of greenhouse gases.

In welcoming publication of the draft (subject to specific points), NSCA commented that whilst the legislation controlling air pollution from industrial sources and road vehicles becomes ever more exacting, air pollution from agricultural activities has remained largely uncontrolled. NSCA's annual surveys (see this issue of *Clean Air*) have repeatedly shown that in those local authorities where agricultural pollution was considered to be a problem, odour, stubble burning, crop spraying and dust were all sources of complaint. Although much of the air pollution caused by agriculture is simply a local nuisance issue, it can also contribute to more widespread problems such as the long-range transport of pesticides; the production of ammonia which contributes to total nitrogen loads; and the production of methane — over one third of the UK total — which has a role in global warming.

In its comments to MAFF on the code, NSCA is unhappy that the tone of the Code is generally permissive of open burning as a means of waste disposal and says that no other industry enjoys such licence. Furthermore, NSCA says, the legal controls relating to burning, smoke and nuisance — which are admittedly complex — are not presented in a coherent fashion. NSCA was also surprised that the draft code contains no reference to the regulations and code of practice relating to the burning of crop residues.

NSCA considers that more emphasis should be given to the role of ammonia in damaging natural ecosystems through nitrogen deposition. The use of good practice to reduce ammonia from manure spreading should be required in its own right at all times and not solely when the reduction of odour nuisance is required.

The fact that the code fails to address the minimisation of air pollution from pesticide use is considered by NSCA to be a major weakness. Pesticides can contaminate the air and be transported over considerable distances due to volatilisation or spray drift. NSCA believes that the code merits an entire section on the minimisation of pesticide use including: technologies which apply and target pesticides more effectively; compounds with narrow specific toxicities; compounds with low volatility; integrated pest control; topographical and meteorological factors. Aerial crop spraying is not considered by this Society to represent good practice under any circumstances.

Finally, NSCA suggests that reference should be made to the potential for controlling nuisance dust from various activities, such as tillage, liming, crop drying, crop storage and harvesting.

CONTROL OF AIRCRAFT NOISE

As reported in the last issue of *Clean Air* (Autumn 1991), the Government is reviewing the current arrangements for protecting communities near airports from noise, and the control of noise from helicopters using temporary sites. In welcoming the consultation paper, NSCA said that it had long held the view that aircraft noise was inadequately regulated, particularly in relation to smaller airfields and the use of helicopters. NSCA suggested that it was perhaps an indication of the confusion of responsibility for controlling aircraft noise that the subject was originally excluded from the terms of reference of the DOE Noise Review Working Party. NSCA had been represented on that Committee and successfully argued that aircraft noise should be included.

The consultation paper puts forward proposals for devolving the Secretary of State and CAA powers in sections 78 and 79 of the *Civil Aviation Act 1982* to local authorities. (These sections enable the Secretary of State to specify noise reduction measures at designated airports.) In concurring with the proposal to create a new power of designation for airports NSCA asks for information about how the need for designation would be agreed: would this be at the request of affected local authorities, and would there be a right of appeal against the need to designate? The provision for an airport to "take into account the costs of possible measures when deciding what proposals to make or to accept" resembles the concept of "best available techniques not entailing excessive costs" but the proposals lack a clear framework for determining what the BATNEEC would be in particular circumstances.

NSCA strongly agrees with the Noise Review Working Party that noise from airfields should come within the scope of the nuisance provisions of the *Environmental Protection Act*, and for the purposes of Scotland, the *Control of Pollution Act.* Penalties could then be imposed by local authorities in England and Wales, allowing a fine on conviction of up to £20,000. This would require noise from airports to be included in section 79 of the Act, either as an additional definition in subsection (1) or by the repeal of subsection (6). Nuisance proceedings could be brought either by local authorities under section 80 or by aggrieved persons under section 82, and conformity with an agreed scheme would be held to represent a "best practicable means" defence. Local authorities in Scotland should be granted similar powers under the *Control of Pollution Act 1974*.

NSCA suggests that if airfield noise were subject to nuisance legislation, it would then be a matter for airport operators to decide whether to prepare guidance which addressed common concerns. Section 71 of the *Control of Pollution 1974* which gives provision for the preparation and approval of codes of practice for the minimisation of noise by the DOE could provide an appropriate formulation.

So far as helicopters are concerned, at the moment they may use temporary landing sites for up to 28 days a year without planning permission. NSCA considers this "28-day rule" under the General Development Order (GDO) an inexcusable loophole for noisy activities. A recent decision to reduce the period to 14 days for clay pigeon shooting activities was shamefully reversed. We would recommend that the temporary use allowance for specified noisy activities, including helicopter landings and noisy sports, should be reduced to 14 days, or less, across the board. Furthermore, withdrawal of GDO rights using an Article 4 Direction or a discontinuance order should not be subject to compensation. Noisy activities are straightforwardly antisocial, and under no circumstances should individuals be compensated for any requirement to cease.

The addition of aircraft noise to the list of statutory nuisances would give local authorities some powers over helicopter noise; they would need to prove that the noise nuisance exists, or is likely to occur or recur, and they could serve an abatement notice which prohibits or restricts the noise. This is not very different from issuing a licence; an abatement notice may specify any works or steps to be taken and the times within which the notice must be complied with. If the notice is contravened the local authority would have to make its case to a magistrates' court and there is a satisfactory appeals procedure for the allegedly noisy person.

As a final point, NSCA feels that further consideration should be given to the control of noise nuisance caused by the recreational use of light aircraft.

NEIGHBOUR NOISE PROBLEMS

Local Authority Guidelines

Local Authorities (LAs) receive many complaints about neighbour noise. This note, prepared by the NSCA National Noise Committee aims to provide practical guidance on how they can discharge their duty in respect of these issues and how to deal with complaints of noise nuisance within a reasonable time. NSCA hopes the Guidelines, which were launched at its annual conference last October, will encourage a consistent and uniform approach to the treatment of neighbour noise problems.

Resources are stretched in all LAs and prioritisation of workload is now an everyday management function. However, LAs may need to re-evaluate their response to noise nuisances from neighbours as a result of three recent developments.

- The *Environmental Protection Act 1990* (EPA) includes vibration as well as noise as a statutory nuisance. Section 79 requires that where a complaint of a statutory nuisance is made to an LA by a person living within its area, the LA must take such steps as are reasonably practicable to investigate the complaint. In Scotland the *Control of Pollution Act 1974* (COPA) still applies.
- The Department of the Environment (DOE) Report of the Noise Review Working Party 1990 (The Batho Report) makes a number of recommendations, including the need for Environmental Health Officers to be available out of office hours to deal with noise complaints.
- The 1990 Environment White Paper *This Common Inheritance.* The DOE and Welsh Office will issue guidance to LAs in England and Wales, restating their duties under the EPA and how they should tackle noise problems in their area, setting out what constitutes noise nuisance and suggesting measurement methods.

Research by the NSCA's National Noise Committee has shown that previous controls under COPA were not consistently effective and that they were not uniformly applied. In particular, response to noise complaints varied widely from LA to LA.

The public has a right to expect uniformity of approach to problems of neighbour noise and this note is intended as a minimum standard of response to complaints and enforcement of the new legislation.

An increasing number of pro-active LAs are adopting "Environmental Charters". A proper response to noise complaints is seen by NSCA as an important part of any "Charter".

It is important that every member of the public be entitled to the same level of service. However, LAs may wish to develop interdepartmental arrangements where appropriate, e.g. liaison with Development Control and with Housing Departments where noise complaints may be dealt with under tenancy agreements. These arrangements can be extended into the private sector by contacting owners and landlords of properties from which noise emanates.

In recommending guidelines which LAs might adopt as a basis for policies NSCA is aware of the considerable implications for resources and staff time which the new legislation implies. No new money has been earmarked for implementing improved noise control under the EPA. Any changes in staff deployment may be at the expense of other areas of work; or a new balance of priorities may have to be struck.

A minimum standard should be set; if more resources become available input into noise complaints can be increased. Service standards should be reviewed in the light of experience and available resources. LAs should continuously assess noise problems; what is acceptable now may not be so in the future. LAs need to be aware of changing needs and target their resources and services accordingly.

It is recommended that the following principles be included in an LA Noise Policy as a summary of the public's reasonable expectations in dealing with neighbour noise.

- To be able to sleep at night.
- Protection from loss of amenity due to noise and vibration.
- Qualified professional staff available to assess existence of nuisance.
- Visits out of hours when necessary to assess nuisance.
- Not to hear someone else's noise in their home on a regular basis, e.g. music, barking, dogs, alarms, DIY.
- The sound insulation of their home to be sufficient to prevent undue disturbance from the normal reasonable behaviour of their neighbours.

NSCA recommends that:

- Each LA adopts and publicises a formal policy on noise control including a formal procedure for dealing with neighbour noise.
- Information should be readily available to advise the public on dealing with noise nuisance, setting out the help which the LA can give.
- A trained officer should be available to give advice and where necessary take immediate action over noise complaints.
- A detailed procedure should be adopted for dealing with noise complaints including draft letters. This will ensure consistency of approach (NSCA can provide lists of authorities who have such procedures).

When a complaint about an alleged noise nuisance is received it is considered that the following action represents a minimum response standard.

(a) Taking the Complaint Details

(i) Complaints are made in person, by telephone, by letter, or often via a third party, e.g. a Councillor. It is essential that trained staff receive the complaint. The complainant's confidence of the Council's service delivery is established or broken at this stage.

(ii) Full details of the nature of the complaint together with any details of occurrences must be obtained together with any action that the complainant has taken and the result. Anonymous complaints should not normally be investigated, except at the discretion of an experienced Officer.

(iii) The Officer should establish whether the complainant has approached their neighbour since domestic noise complaints can often be settled amicably between the parties without LA involvement. An informal approach by the complainant is not only courtesy but also the first step in resolving any differences.

(iv) The complainant should be asked to make a note of continued noise either in the form of a diary or in notes indicating time, duration, type of noise and its effect.

(v) It is important to reassure the complainant about anonymity when the complaint is being investigated. However complainants should be told that it is very likely that their identity will be guessed when investigations are made, and that they may be required to attend any subsequent Court proceedings to act as a witness on behalf of the Council should this action prove necessary.

(vi) Relevant booklets should be available:

“Bothered by Noise” — DOE
“Neighbourhood Noise Problems — What You Can Do” — NSCA
“Improving Sound Insulation in Your Home” — BRE

LAs may wish to produce their own booklets and this is to be encouraged.

(vii) In view of the large number of domestic noise complaints made to LAs, it is important to find ways of dealing with them effectively, efficiently and economically. As a preliminary step in dealing with individual complaints the Council may wish to write to the alleged noise maker explaining the nature of the complaint and asking for action to be taken to remedy the situation. A letter should also be sent to the complainant explaining what preliminary action has been taken.

(viii) If this action does not prove successful in alleviating the disturbance/nuisance a second complaint should be fully investigated.

(ix) In order for Section 79 EPA to be complied with the NSCA believes it essential that the investigation of any noise complaint is carried out at the time it is considered likely to be witnessed. This will inevitably mean that Officers will be required to work at unsocial times (nights and weekends) but NSCA considers such action as *“Reasonably Practicable”*.

(b) Investigation of Complaint

(i) Armed with the information provided by the complainant, an Officer (normally an Environmental Health Officer or some other person shown to be suitably competent to make such a judgement) visits and interviews the complainant at the time “most likely” to witness the alleged noise.

(ii) If the noise is witnessed at the time of visit the Officer should make a judgement whether the noise is a nuisance. This may be a result of subjective assessment (e.g. for domestic activities, audio equipment, etc). Appropriate noise measurements may be made for comparison, record purposes, etc.

(iii) The Officer should reiterate the procedures for dealing with complaints so that the complainant knows exactly what the investigation involves.

(iv) The Officer "should then establish whether the high level of sound transmission in his opinion amounting to a nuisance, is due to unreasonable behaviour or due to poor inherent sound insulation" (see report on *Sound Insulation in Flat Conversions — Part 2 — Legislative and Technical Solutions* — NSCA 1987). A noise nuisance may be caused through the inadequacies of the building itself, in which case it would be appropriate to take action against the owner: see e.g. Southwark London Borough Council v Ince (1989) 153 JP 597; and Sampson v Hodson-Pressinger (1981) 3 All ER 710.

(v) If and only if the Officer is satisfied that the noise amounting to a nuisance is caused by unreasonable behaviour, he/she must start Summary Proceedings for Statutory Nuisance as required by Section 80 EPA.

It is considered "reasonable" for an Officer to visit the complainant on at least three occasions at a time likely to witness the complaint. If a noise is observed it may be necessary to make further visits in order to prove nuisance, for instance in the case of barking dogs.

LAs should make provision for planned "out of hours" visits in respect of complaints and it is recommended that a 24 hour service be available for unpredictable, sporadic or serious problems requiring immediate action.

LAs may wish to take informal action against the person "responsible" for the nuisance before taking formal legal action under Section 80 EPA. However, that section is quite specific in its requirement that "where an LA is satisfied that a statutory nuisance exists, or is likely to occur or recur, in the area of the Authority, the LA **shall** serve a notice ("an abatement notice") imposing all or any of the following requirements:

(a) requiring the abatement of the nuisance or prohibiting or restricting its occurrence or recurrence;

(b) requiring the execution of such works, and the taking of such other steps, as may be necessary for any of those purposes,

and the notice shall specify the time or times within which the requirements of the notice are to be complied with."

(vi) If after three separate visits the Officer has not been able to witness any noise or only noise which is not considered to be a nuisance the complainant should be informed:

- of the action already taken to investigate the complaint;

- that the Council is unable to take any further action;
- how to take their own action in the Magistrates Court under Section 82 EPA. (The NSCA's booklet "Neighbourhood Noise Problems" is particularly useful in this matter.)

General

These guidelines are intended as brief indicators of good practice. Councils may choose to do more to investigate noise complaints (e.g. setting up *all night* investigation teams) but the guidelines are considered a minimum response.

"Statutory Nuisance" has not been defined in the legislation but the Courts have held that it includes noise which is a nuisance at common law. It has long been established in Britain that noise can be considered a nuisance when it is a condition or activity which unduly or materially interferes with the individual's rights, use or enjoyment of land. This is particularly relevant to neighbour noise issues. It is only necessary for one person to be affected by a nuisance for an authority to be required to investigate.

In addition LAs should evaluate alternative methods of reducing or resolving neighbour noise complaints. These include:

- improved publicity to raise awareness about noise issues;
- the use of community conciliation services to resolve inter-neighbour disputes;
- the use of dog wardens in cases involving barking dogs;
- the development of pilot neighbourhood "noise watch" schemes.

It is intended that these guidelines will provide a basis for agreement on what level of response is "reasonably practicable" for a Local Authority, and will encourage a consistent and uniform approach to the treatment of neighbour noise problems.

INCINERATION OF WASTES

Evidence to the
Royal Commission on Environmental Pollution

The Royal Commission is undertaking a study on environmental pollution arising from the incineration of wastes. The study is concerned with the environmental impact of land-based incineration, including emissions to the atmosphere and disposal of residues. It is looking at the design and operation of plant and of regulatory issues and cost. It plans to cover the incineration of most kinds of waste, including municipal, clinical, toxic and other chemical wastes, sewage and agricultural sludge and animal remains.

1. Introduction

(a) The destruction of waste by incineration has acquired a poor reputation in the UK. Research by Warren Spring Laboratory(1) and by the NSCA(2) has shown that many of the UK's current municipal and clinical waste incinerators are grossly polluting. Doubts have been raised about the safety of hazardous waste incineration, whilst the need to incinerate sewage sludge has resulted from tightening controls on the dumping of sewage in the sea.

(b) Alternative strategies for the disposal or minimisation of waste also impact on the environment — often in ways which are difficult to compare directly with incineration. This paper explains the way in which incineration is regulated in the UK; examines the arguments which are advanced in its favour and against; and recommends that incineration can be acceptable providing it is in a political framework which is able to evaluate the Best Practicable Environmental Option (BPEO) for the waste stream as a whole.

2. UK Regulatory Background

(a) The *Environmental Protection Act 1990* (EPA)(3), requires the authorisation of polluting processes using the best available techniques not entailing excessive cost. "BATNEEC" must be used to minimise pollution to the environment and where this involves discharges to more than one environmental medium, it must have regard to the BPEO. Existing plant must eventually meet the strict standards set for new plant in Process Guidance (PG) Notes.

(b) For processes controlled by local authorities, existing plant must be upgraded to new plant standards within the timescales shown below but must also meet less stringent interim standards from the date of their authorisation under the EPA. All local authorities should have received applications for authorisation from incinerator operators by 30 September 1991.

Guidance Note	*Incineration process*	*Comply by*
PG 5/1	Clinical waste <1 tonne/h	Oct 95
PG 5/2	Crematoria	Apr 98
PG 5/3	Animal Carcases <1 tonne/h	Oct 95
PG 5/4	General Waste <1 tonne/h	Oct 95
PG 5/5	Sewage Sludge <1 tonne/h	(no existing processes)

(c) Although local authorities are in general finding it difficult to attract applications for authorisation, our initial soundings following the September deadline suggest that most incinerator process operators have made applications as the legislation requires. However our impression is that many — particularly hospital incinerators — intend to meet interim standards, operate for a further four years and then close down. In the case of at least one animal carcass incinerator, the operators (MAFF) intend to reduce the capacity below 50kg/hr in order to avoid authorisation. Thus although the PG Notes require upgrading of existing processes to new plant standards "whenever the opportunity arises", and require a programme of upgrading to be submitted to the local authority within six months of the first authorisation, local authorities have no powers to *require* process operators to upgrade beyond the fairly rudimentary interim emission standards. Operators have been granted, in effect, a four-year holiday from tighter standards; even longer in the case of crematoria.

(d) Draft PG Notes(4) relating to incineration processes controlled by HMIP are currently under consultation as follows:

IPR5/1	Merchant and In House Chemical Waste Incineration
IPR5/2	Clinical Waste Incineration >1 tonne/h
IPR5/3	Municipal Waste Incineration >1 tonne/h
IPR5/4	Animal Carcass Incineration >1 tonne/h
IPR5/5	Burning Out of Metal Containers
IPR5/11	Sewage Sludge Incineration >1 tonne/h

(e) The draft PG Notes for these processses — potentially more polluting than those controlled by local authorities — do not set a specific timetable for upgrading existing plant to new plant standards, but state that all applications for authorisation must include a programme for upgrading (or closure) which meets the requirements of the EC 1984 Framework Directive on industrial air pollution(5). This requires Member States to develop policies for the gradual upgrading of existing plants to meet the best available technology. HMIP Inspectors therefore have some discretion in determining how quickly, and to what standards, existing plant are upgraded.

(f) Otherwise, existing *chemical incineration* and *burning out* plant continue to be required to meet the standards of the current Best Practicable Means (BPM) Note 11(6). *Municipal solid waste (MSW) incineration* plant must meet the terms of the EC Municipal Waste Incineration Directives(7) which set standards for new plant and a timetable for existing plant to be upgraded to new plant standards from 1995. The likely effect of this Directive is that many of the existing MSW incinerators will close down because of the cost of additional pollution abatement measures(8).

The EC Municipal Waste Directives — Summary of Standards

Emission limit values in mg/m^3 as a function of the nominal capacity of the incineration plant

Pollutant	*Less than 1 tonne/h*	*Between 1 and 3 tonnes/h*	*3 tonnes/h or more*
CO	100	100	100
Total dust	200	100	30
Total organic carbon	20	20	20
Heavy Metals:			
Pb+Cr+Cu+Mn	—	5	5
Ni+As	—	1	1
Cd and Hg	—	0.2	0.2
Hydrochloric Acid (HCl)	250	100	50
Hydrofluoric Acid (HF)	—	4	2
Sulphur dioxide (SO_2)	—	300	300

Combustion gases in combustion chamber(s) must be kept after the last injection of combustion air at least at 850°C for 2 seconds in the presence of at least 6% oxygen.

Draft EC Standards for Hazardous Waste Incineration

Daily average value	*mg/m^3*
CO	50
Total dust	5
Total organic carbon	5
HCl	5
HF	1
Half-hourly average value	
CO (97% percentile)	60
CO	100
Total dust	10
Total organic carbon	10
HCl	10
HF	2
SO_2	300
Averages over sample period	
Cd+Tl+Hg	0.1 (total)
Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V+Sn	1 (total)
Dioxins and furans	0.1 ng/m^3

Combustion gases in combustion chamber must be kept after the last injection of combustion air at least at 1200°C for 2 seconds in the presence of at least 6% oxygen or 3% when fed with liquid wastes.

(g) For all new plant the PG Notes for both local authority and HMIP sectors are considered to represent BATNEEC. In the case of IPR5/1, 5/2 and 5/11, the emission standards meet draft EC proposals for new hazardous waste incinerators (9), which are even more stringent than those for MSW incinerators.

(h) It is noticeable that the emission standards for "ordinary" pollutants such as hydrochloric acid (HCl) and sulphur dioxide (SO_2) are stricter for incinerators — and much stricter for hazardous waste incinerators — than for combustion plant or other industrial processes. Whilst HCl from incineration is no more hazardous than

HCl from power stations, it should be emphasised that the emission standards are used as a guide to the effectiveness of the pollution abatement methods in reducing not just the pollutants specified, but also a range of other compounds which are not directly monitored.

(i) An important issue here is whether the combustion of waste derived fuel (WDF) for energy purposes should meet differing emission standards than the incineration of municipal waste, since most modern MSW plant incorporate energy recovery. Emission standards for incineration plant are more exacting than for fossil fuel combustion plant. Combustion plant burning "fuel manufactured from municipal waste" should meet the New Municipal Waste Incineration Plant Directive, but this allows for certain derogations for plant "specifically designed to burn waste derived fuels"(10). The current draft PG note for WDF combustion therefore fails to include any emission standards for air pollution because of a legal dispute with the EC Commission over derogation. We fail to see why the standard of emissions from WDF plant should be any different to that from MSW plant.

(j) The broad picture is that existing incineration plant have a number of years — NSCA would argue too many — to upgrade to the standards required for new incineration plant. As the deadlines are reached, many plant will be closed down as the costs of upgrading would render them uneconomical. New plant, however, will be required to meet stringent emission standards.

3. The Case Against Incineration

General Points

(a) The process of incineration does not totally destroy waste, but merely reduces its bulk. The combustion process can create or make more available a wide variety of compounds which are known or suspected to be hazardous. These may be released into the flue gases, trapped in dust collected from the flue gas by dust arrestment plant or left in the residual grate ash. The major causes for concern are heavy metals and products of incomplete combustion (PICs), of which the chemical family of dioxins and furans (generically termed dioxins) are the best known. Current UK incineration processes are thought to produce between one quarter and one third of dioxin emissions in the UK(1)(11). Opponents of incineration point out that, even if plant operate consistently to high standards, some PICs will inevitably escape the pollution control system(12), albeit in tiny quantities. Furthermore the residual grate ash and flue ash contains heavy metals and still requires disposal. Much of the debate about incineration hinges on the assessment of risk from PICs and heavy metals in comparison to other environmental hazards.

(b) The very existence of incinerators reinforces a system which favours the production of waste. Whilst producers of waste are guaranteed a disposal route — for domestic, clinical or chemical waste — they are less likely to develop clean technologies, waste reduction or recycling. Even if incineration is expensive, it may prove cheaper in the short term than developing new production processes or making major infrastructure changes.

Specific Points

(c) *Municipal Waste.* A considerable proportion of MSW could be separated out for recycling or composting. The remaining fraction does not need to be incinerated; low-temperature treatments such as controlled landfilling or anaerobic digestion can yield usable methane gas without resorting to combustion.

(d) *Clinical Waste.* The residue from clinical waste concentrates metal "sharps" such as needles and scalpel blades which can be dangerous.

(e) *Sewage Sludge.* In the case of sewage sludge, the need for incineration has arisen because of the ban on sea dumping of sewage. Whilst sea dumping may be environmentally unwelcome, incineration may actually prove to be an unnecessary (and financially worse) option in parts of the UK where the local marine ecosystem is capable of absorbing sewage without long-term damage(13). Sewage sludge is also a source of useful nutrients with potential for agricultural and horticultural use, replacing fertilisers which require energy in production, or alternatively soil conditioners such as peat which are non-renewable. Incineration of sludge destroys this potential.

4. The Case For Incineration

General Points

(a) Although new technologies could reduce the production of wastes there will always be a minimum level of waste which will require disposal. Recycling is clearly a desirable objective but there is a threshold at which recycling materials becomes so energy-intensive that its net environmental impact is negative.

(b) There is little evidence to link incineration plant with adverse health effects. Furthermore, given the poor performance record of incineration in the UK it is to be expected that new plant built to tight specifications would further reduce any possible risk. In many environmentally-conscious countries modern heat-from-waste incinerators are sited in the centre of urban areas.

Specific Points

(c) *Municipal Waste.* To meet the Government's target of recycling 50% of recyclable domestic waste could cost an estimated £200M(14) per year. Landfilling is currently cheap, but likely to become more expensive as available sites fill up and European legislation(15) imposes stricter standards. Landfills are a major source of the greenhouse gas methane, contributing 21% of UK emissions(16); this is estimated to be equivalent to the total emissions of CO_2 from road transport in greenhouse terms(17). Landfill sites also require the containment of potentially toxic leachate, but they do offer the opportunity of partial methane recovery for energy projects. In some parts of Britain adequate landfill sites are still available but this may not be the case in the future; in the West Midlands, Hampshire and North East England suitable sites have virtually disappeared.

(d) Incineration is currently expensive but in some areas of the UK may be adopted where the alternative is transportation of waste over long distances to landfill sites. Incineration of MSW offers the opportunity of energy recovery — municipal waste has around one third of the calorific value of coal, a value which is unlikely to change even with enhanced recycling rates. Energy is likely to be recovered more efficiently than through landfill gas extraction. Many other countries operate MSW-fired combustion plant to generate electricity, heat or both. The USA for example has 136 waste-to-energy plants burning 29 million tons of MSW and generating enough energy to meet the needs of 1.2 million households(18); 100 more are planned. In Europe the incineration of MSW accounts for 80% of disposal in Switzerland; 50% in Sweden; 40% in The Netherlands; 35% in West Germany; compared with just 8% in the UK(8).

(e) A discussion paper(17) published in 1990 by NSCA concluded that municipal waste should be incinerated in large incinerators of designs readily available in Europe and North America which meet the strict standards of the appropriate European Community Directive. The generated heat should be used in power schemes or, preferably, in local combined heat and power (CHP) schemes similar to systems widely adopted in Europe. The initial capital cost of the plant will be high; however these costs should be partially met with assistance from Government or regional subsidies. Incineration will also benefit from the "Non Fossil Fuel Option" requirements placed on the electricity supply industry which guarantee favourable prices for electricity generated from waste. A tax on domestic waste disposed of on landfill sites on the "polluter pays" principle could also be used to support the capital costs of incineration plant.

(f) The House of Lords Select Committee on the European Communities(19) urged the Government to review their support for investment in capital projects aimed at reducing emissions from incinerators, particularly in inner-city areas: "The Committee judge from the evidence they have received that combined incineration and heat/energy recovery schemes are desirable. Such schemes enhance the attractiveness of incineration, on grounds of economy and energy conservation, and the Committee favour the adoption of such schemes where practicable".

(g) *Hazardous Waste.* In the case of hazardous chemicals, incineration may be the only technology which can guarantee the effective destruction of wastes, particularly organic wastes which are not biodegradable.

(h) *Clinical Waste.* Similarly, incineration of clinical waste is considered to be the optimum solution for the destruction of clinical waste. Crown Immunity was removed from hospital incinerators following a campaign by NSCA(2). As a result most existing incinerators will be unable to meet new standards and will close within four years. The likely outcome is a smaller number of strategic waste incinerators designed to meet the new standards, and this may also result in segregation of general "ward waste" from the genuine clinical waste(20).

5. NSCA's View

(a) There is a paradoxical debate between environmentalists: some favour incineration as part of an "environmentally friendly" renewable energy strategy or because it can destroy persistent toxic chemicals which would otherwise pose an environmental threat; others are opposed because of health concerns or because it discourages waste minimisation and recycling.

(b) The Society believes that as long as individual incinerators meet BATNEEC criteria and are effectively monitored by local authorities or HMIP, air pollution from incinerators should come low on the list of health worries for local residents. They may still have legitimate objections but these will be on the basis of amenity, not health. Public confidence depends on full access to information and independent policing; we must emphasise the importance of adequately resourced pollution control agencies as a prerequisite for effective monitoring and enforcement of incineration processes. The use of sealed monitoring and recording devices for inspection by the regulating authorities is recommended.

(c) Whilst standards for *individual incinerators* may meet BATNEEC, does incineration always constitute the Best Practicable Environmental Option? Given current legislation it may make economic sense for an individual water company to incinerate sewage sludge, but a more integrated policy investigation might conclude that joint digestion of sewage with MSW or crop residues would be environmentally preferable. No such mechanism exists in the UK. One incinerator might be acceptable locally, but is it appropriate to site several competing schemes in the same area — as is happening currently in south-east London? Nobody has the authority to study the proposals and suggest a mix which would minimise environmental impact. Once waste is produced it must be disposed of in one way or another; sadly HMIP's new IPC PG Notes for industrial processes say very little about waste minimisation in comparison with pollution control techniques. There are no powers in the field of chemicals policy which could reduce or eliminate the use of toxic substances where suitable alternatives exist. Industry is not directed to adopt cleaner technologies which have waste minimisation engineering built in at conception. The approach still tends towards bolt-on, end-of-the-pipe solutions which create a pollutant and then try to recapture it before it escapes.

(d) Of course no waste disposal solution is totally clean — what distinguishes differing approaches is the extent and nature of their environmental impact, and the values which we attribute to them. From the perspective of individual waste disposal authorities, different solutions will be appropriate in different locations. What is lacking is any analysis of the BPEO for the waste stream as a whole. The real point is the inability of the British governmental system to look at an issue — and waste disposal policy is a good example — to develop and promote the BPEO. Responsibility is too widely spread amongst competing Government departments and other agencies. We welcome the Government's aim for national and regional self-sufficiency in waste disposal(21); this should prevent particular parts of the UK from becoming "dumping grounds" for waste which is generated elsewhere. The corollary of this approach is that waste disposal plans and methods should also be co-ordinated on a regional basis.

(e) One of the primary functions of the proposed Environmental Protection Agency should be to provide this kind of strategic overview. The Society believes that such an overview would conclude that incineration is indeed the BPEO in certain situations for certain forms of waste. However an EPA should also be pioneering the introduction of clean technologies, promoting waste prevention and minimisation in all sectors, optimising recycling where appropriate, and developing integration where the current institutional infrastructure discourages collaboration. We therefore regret that current plans(22) for an EPA have a comparatively narrow remit which exclude such questions of broader environmental policy.

(f) Even with a regional assessment of waste disposal needs which optimises the treatment of the waste stream, the siting of individual disposal facilities — whether incineration, waste transfer, landfill, digester or whatever — will inevitably face local NIMBY opposition. As noted above, the public's distrust of incinerators in particular is to some extent justified by experience with current plant which perform poorly or are inappropriately sited. It will therefore be important to develop a siting policy which prevents plant being located immediately adjacent to sensitive environments and takes account of the topography in terms of the potential for plume or gas dispersal. Any environmental assessment of proposed plant will also need to show how BATNEEC will be achieved in terms of the abatement technology to be used, the character and dispersal of any emissions, and the monitoring regime to be employed.

(g) In summary, there will be many situations where incineration is the most environmentally acceptable method of waste disposal, but it must be set in a context of an effective waste minimisation and co-ordinated disposal policy. It has clear advantages as a source of energy and as a method of dealing with some intractable wastes. Public confidence in incineration will only be gained if it can be demonstrated that the best possible standards are maintained and monitored independently. This situation already pertains in many countries; it is a sad comment on the UK that we are still some distance from this objective.

6. References

(1) Warren Spring Laboratory, *Review of Municipal Solid Waste Incineration in the UK*; WSL, 1991.
(2) *Air Pollution from Crown Property*; NSCA, 1988.
(3) *Environmental Protection Act 1990*; HMSO, 1990.
(4) Draft PG Notes *IPR5/1-5/5 and 5/11*; HMIP, 13.9.91.
(5) 84/360/EEC *Directive on Combatting Air Pollution from Industrial Plants*; L188 16.7.84.
(6) BPM 11, *Chemical Incineration Works*; HMSO, 1989.
(7) 89/369/EEC, *Directive on Air Pollution from New Municipal Waste Incinerators*, L163 14.6.89.
89/429/EEC, *Directive on Air Pollution from Existing Municipal Waste Incinerators*, L203 15.7.89.
(8) Woodfield M., *The Future of Incineration in the UK*; NSCA Conference Proceedings, 1989.
(9) European Commission, *Draft Proposal for a Directive on the Incineration of Hazardous Wastes*, 17.5.90.
(10) Draft PG Note *IPR1/5*; HMIP, 13.9.91.
(11) DOE Pollution Paper 27, *Dioxins in the Environment*; HMSO, 1989.
(12) *A Report on the Hazardous Waste Incineration Crisis*; Greenpeace International, The Netherlands, 1991.
(13) Mason C., *Regions the Key on Environment Issues*; letter to The Independent, 13.8.91.
(14) Barton J., *Recycling — Can Local Authorities Make It Pay?*; Clean Air Vol. 21 No. 2, 1991.
(15) COM(91)102 final, *Proposal for a Council Directive on the Landfill of Waste*; 22.5.91.
(16) DOE, *Digest of Environmental Protection and Water Statistics No. 13*; HMSO, 1991.
(17) Lees B., *Can We Afford to Waste Municipal Waste?*; NSCA, 1990.
(18) J. Air Waste Manage. Assoc. Vol. 14 No. 9 p1154, 1991.
(19) House of Lords Select Committee on the European Communities, *Air Pollution from Municipal Waste Incineration Plants*; HL Paper 17 HMSO, 1989.
(20) Hall R.A.B., *The Future for Clinical Waste Management*; NSCA Conference 1991.
(21) *This Common Inheritance*, p197. HMSO 1990.
(22) DOE Consultation Paper, *Improving Environmental Quality*, October 1991.

NSCA STRAW AND STUBBLE BURNING SURVEY 1991

Introduction

The burning of the majority of crop residues is to be banned after the 1992 harvest under section 152, Part VIII of the *Environmental Protection Act 1990*. Interim regulations were introduced this year to replace existing byelaws which reinforce and rationalise previous controls on burning practices. Also, MAFF launched an extensive publicity campaign in an effort to minimise problems in the remaining burning seasons. NSCA continues to monitor the situation to assess the effectiveness of current controls and the extent to which farmers are preparing for the ban. This summer had a wet start, with dry conditions towards the end of the season. According to our survey weather does not appear to have affected the overall level of burning, although fire brigade call-outs were reduced.

While the attitudes of farmers appear to have improved and burning has been curtailed in anticipation of the ban, there are a number of areas where notifications and complaints remain high and EHOs are pessimistic about any change in the attitudes of farmers.

Existing Controls

The Crop Residues (Restrictions on Burning) (No. 2) Regulations 1991

These regulations replace the old byelaws and came into force on 12 July 1991. They apply to cereal straw, cereal stubble, field beans, linseed, oil seed rape and peas. Under the regulations farmers must: not burn at weekends/bank holidays, comply with firebreak requirements, ensure burns are supervised by responsible and experienced staff, give notice to appropriate authorities, provide firefighting equipment and incorporate ashes within a reasonable period. A fine of up to £2000 may result from any contravention of the regulations.

As there was an error in the first issue of the regulations a number of local authorities complained that they were unable to enforce them as they received copies very late. others complained that the regulations were unenforceable as no enabling powers are contained within the *Environmental Protection Act*— although MAFF advised that the *Parliamentary and Local Governement Act 1972* should be used. It was also observed that, like the byelaws, the regulations have no effect in reducing nuisance or air pollution.

MAFF Guidance

This year MAFF launched an extensive publicity campaign, sending guidelines to all farmers in England and to cereal farmers in Wales. These covered the regulations and gave further guidance aimed at minimising nuisance — including checking weather forecasts, burning in the morning to minimise smut nuisance and avoiding discomfort to the public. Some authorities attributed an increase in notifications and improved attitude of farmers to the campaign, while others were surprised at the level of ignorance of farmers.

The Ban

The concern of many local authorities has been the provision for exemptions from the ban on crop residue burning in the proposed regulations as they feel that some farmers may take advantage of this.

> 'The problem of stubble burning will not cease until it is stopped completely' *(Rotherham MBC)*

Currently it is proposed that the following crops will be exempt: herbage seeds, reeds, lavender, hops, potato haulms. The exemption of linseed and discretionary lifting of restrictions for cereal crops where soil and climatic factors make incorporation impracticable are still under consideration. A final decision will be notified in time for farmers to make arrangements for the 1993 harvest.

While in many areas local authorities report that burning is being curtailed in preparation for the ban, some areas still report widespread burning and are wary of any form of exemption.

Scotland

Currently there is no legislation controlling crop residue burning in Scotland. Local authorities report that where there is a problem, people do not necessarily complain as they know it is not an offence. The police have had to caution farmers as a result of smoke causing hazardous driving conditions and controls on burning would be welcomed.

1991 SURVEY RESULTS

All UK local authorities were sent a survey form. The 1991 survey results are compared with those for 1990, where applicable. It must be taken into account that the 1991 regulations do not apply to Scottish authorities.

	1991	1990
Total no. returns:	**297**	321
Nil returns: (Local authorities where straw/stubble burning is not a problem.)	**138**	165
Authorities providing information:	**159**	156

Comment: There is little change in the number of authorities where stubble burning is a problem.

Overview

1. Is it your impression that the situation this year was:

a. much worse than last year	**9**	10
b. slightly worse than last year	**24**	17
c. about the same as last year	**53**	45
d. slightly better than last year	**50**	49

e. much better than last year	**16**	28

Comment: Overall, the situation is felt to be better than last year.

2. If you noted any change, was this due to:
(tick more than one if necessary)

a. weather conditions less favourable to burning	**21**	21
b. weather conditions more favourable to burning	**17**	17
c. improved attitude of farmers	**44**	53
d. worsened attitude of farmers	**8**	8
e. effective enforcement of regulations by authority	**10**	6
f. ineffective enforcement of regulations by authority	**2**	2
g. toughened MAFF guidance	**22**	21
h. other	**19**	16

Comment: The publicity campaign by MAFF was felt to have improved attitudes.

Observation of regulations

3. Were there any problems with:

a. firebreak requirements	**30**	41
b. fire supervision	**21**	23
c. ash incorporation	**22**	12
d. notification of relevant persons/authorities	**57**	44
e. burning in unsuitable weather conditions	**34**	23
f. burning after sunset/at weekends	**16**	15
g. any other requirements	**7**	3

Comment: Problems reported include burning in high winds, lack of firefighting equipment.

Enforcement of regulations

4. Were there any problems with:

a. insufficient staff for surveillance	**67**	76
b. gaining evidence for prosecutions	**22**	22
c. locating burns and gaining access	**30**	36
d. assessing size of firebreaks	**4**	6
e. enforcing ash incorporation period	**4**	6
f. any other aspect	**5**	4

Comment: Inadequate staffing presented major problems. Many complaints relate to smoke from other authorities, compounding the difficulty in locating burns.

Complaints

5. Did you receive any complaints?	yes	**133**	141
	no	**26**	33

6. If yes, how many related to:

a. smoke/smut nuisance	**939**	814
b. reduced visibility on roads	**45**	59
c. effects of human health	**71**	88
d. threat/damage to property	**37**	49
e. threat/damage to wildlife and habitats	**16**	35
f. any other aspects?	**45**	43

Comment: Surprisingly, while the number of local authorities reporting complaints was less than for 1990, the actual number of complaints showed a slight increase.

Fire brigade involvement

7. To your knowledge was the local fire brigade called out to any straw/stubble burning incident?

yes	**55**	84
no	**96**	66
not known	**8**	6

8. If Yes, on how many occasions?		**339**	922
	not known	**14**	—

Prosecutions

9. Do you intend to prosecute for any breach of the regulations in 1991?

	yes	**20**	33
	no	**139**	123
no. of separate prosecutions pending		**26**	42

Effectiveness of regulations

10. Overall, do you consider that the operation of the new regulations in 1991 proved effective for: (1990 figures refer to byelaws)

	yes		no	
a. fire prevention	**93**	89	**28**	39
b. prevention of smoke/smut nuisance	**40**	29	**92**	106
c. preventing threat/damage to property	**92**	81	**34**	48
d. preventing threat/damage to wildlife	**63**	32	**54**	76

Comment: Some authorities felt unable to comment on these due to the late arrival of the regulations and low priority given to surveillance. While the regulations are seen to improve safety, they do not abate nuisance.

Agricultural burning and Clean Air Act 1968

Last year the DOE confirmed to NSCA that agricultural land should be considered as trade and industrial premises for the purposes of s1 of the *Clean Air Act 1968.* Do you intend to prosecute any farmers for causing dark smoke under the *Clean Air Act 1968*?

a. for straw/stubble burning	**8**	33
b. for burning other crop residues	**8**	33
c. for other burning on agricultural land	**20**	48

ANALYSIS

Straw and Stubble Burning

On the whole local authorities thought the situation was the same or slightly better than last year citing awareness of the regulations and of the coming ban as reasons for this. Some saw farmers making the most of their last opportunities to burn. Other areas reported an increase in notifications, revealing more widespread burning — probably because of the high profile MAFF campaign — and two areas reported their first ever burns! This point emphasises the perennial problem of surveillance in large rural authorities — where unnotified burns easily go unnoticed unless a complaint is registered. Once again failure to notify was the main breach of regulation and insufficient staff the main hinderance in enforcing legislation. A number of local authorities pointed to impossibility of enforcement and the low priority given to surveillance.

> 'When towns are covered in smoke from farms sometimes 3-4 miles away it is impossible to establish who is causing the nuisance'. (*Kings Lynn and West Norfolk DC*)

Several authorities complained that the late arrival of the regulations left them unable to make any observations on their effectiveness or to take any action when a problem did arise.

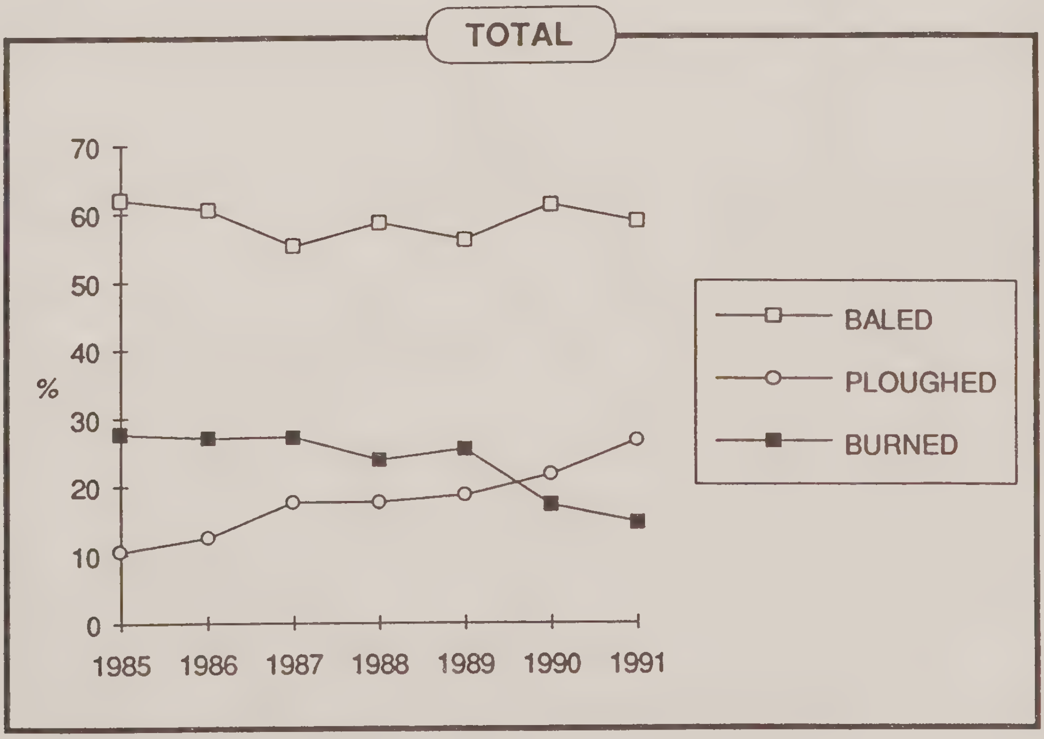

Figure 1: Straw Disposal for Main Cereal Crops
Source: MAFF

The number of complaints received remained at a similar level to last year which is a cause for concern but according to MAFF statistics the overall level of burning has diminished. Figure 1 shows the pattern in straw disposal for main cereal crops over the last seven years. In 1991, 14.6 per cent of straw was burned in the field — this figure excludes stubble burned after removal of straw.

Complaints about smoke and smut nuisance persist — many people apparently surprised that burning is still permitted. Fire brigade call-outs were down by a third — possibly due to drier conditions last year. The number given is only an indication of the true figure as a number of authorities were unable to obtain information from the fire brigade. Prosecutions were also down — hopefully due to greater awareness of the regulations — but some authorities expressed their frustration at not having the regulations to hand where there was potential to prosecute.

Agricultural Burning

Fewer authorities report any problems with general agricultural burning this year, with prosecutions down, although many indicate their intention to use the *Clean Air Act* should the need arise.

Summary

The pattern which emerges is that overall the picture has improved. However, in the large arable areas of eastern England a significant level of burning, nuisance and complaint exists and some EHOs are dubious about farmers' intentions to seek alternative methods.

> 'Although it does not appear that the problem of stubble burning has been any worse this year, there have been several days when a pall of smoke has hung over the district, impairing visibility. It has been estimated that 8% of the land in South Kesteven has been burnt.' (*South Kesteven DC*)
>
> 'On the whole. . .farmers have taken little if any action to conform with the legislation. Farmers consider stubble burning as a right and do not give consideration to other methods'. (*Sedgefield DC*)

It is disappointing that the level of complaint has not diminished, but it may be that farmers are just making the most of their last opportunity to burn.

REPORT

MODELLING TRAFFIC POLLUTION

Dr. Keith Simms
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This paper was presented at an NSCA training seminar held in Birmingham in September 1991.

Introduction

This paper discusses the appropriate modelling of the air pollution from new or modified traffic schemes to provide predictions of the environmental impact of those schemes. The term modelling is used here to mean the simulation process used in obtaining predictions of air quality impact.

The Role of Modelling

Modelling has two main roles. The first is the prediction of the impact of proposed road schemes or of planned modifications to schemes. This clearly cannot be measured directly since the situation under consideration does not yet exist. The second role is in support of monitoring. Monitoring is expensive in both time and equipment and often cannot give as complete a picture of the air quality in an area as one would like. Even with the more modern techniques of remote sensing the required weather conditions cannot be guaranteed when the equipment is available. If a model can correctly match the current situation for which data are available then it can be used with some confidence to fill in the gaps in the monitoring data. This sort of exercise is useful prior to using a model to predict the impact of future situations.

What Modelling Should Provide

With any form of modelling it is necessary to decide upon the form of the required results. If there are legislative or guideline criteria for the levels of the pollutant(s) being considered then the modelling should predict if and when these are being exceeded. If a criterion is exceeded, it might then also be useful to determine some measure of by how much it is exceeded if this can be used in assessing the level of remedial action required. For example, one of the criteria commonly used in the UK for ambient air carbon monoxide concentrations is that an eight-hour average value of 9 ppm should not be exceeded more than once per year. The most useful prediction is then one that gives the expected number of days per year for which the 9 ppm eight-hour limit will be exceeded. This is not the same as predicting a worst case eight-hour average value, which might occur significantly less than once per year.

The results are often best presented in the form of a contour enclosing the area over which a criterion will be exceeded. Figure 1 gives a simple diagrammatic example of this. If key locations are of interest these can be marked on the plot. This illustrates the true situation rather better than just a note of simple values for the specified locations.

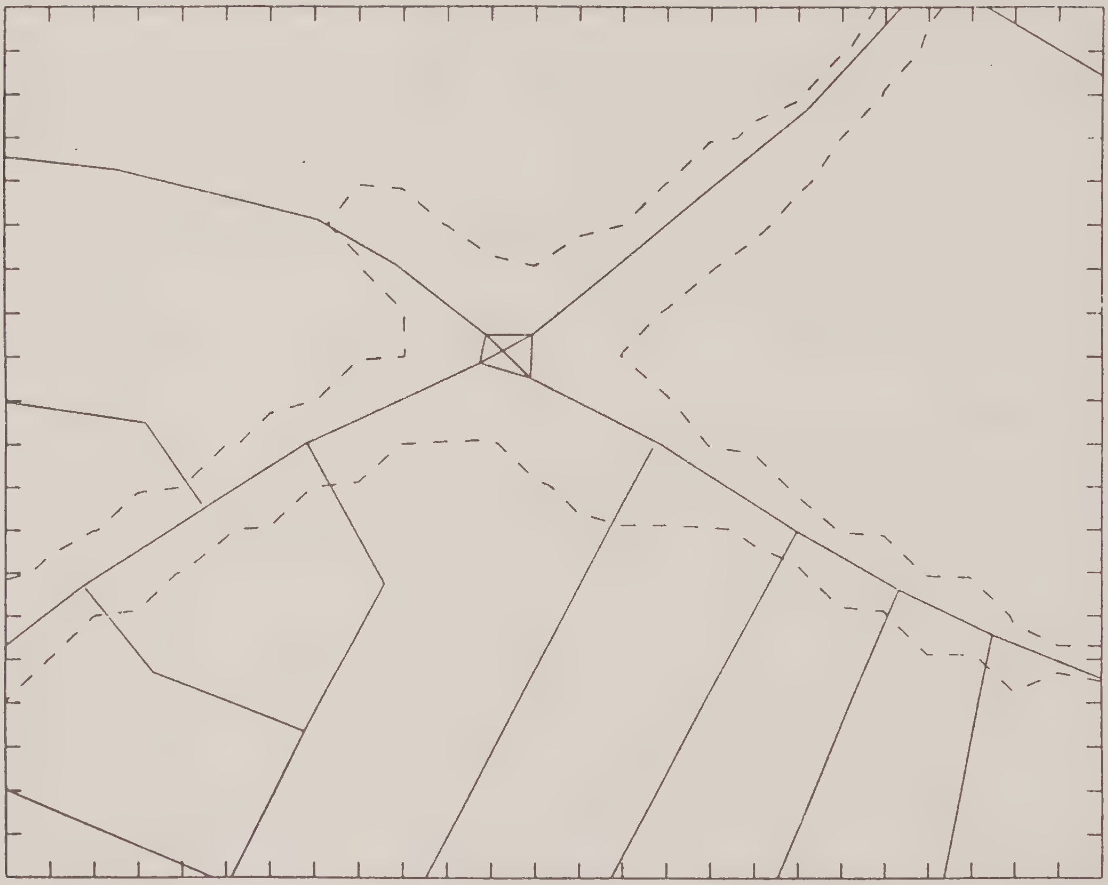


Figure 1: Example of contour enclosing area exceeding the one or more days per year of greater than or equal to 9 ppm eight-hour average concentration of ambient carbon monoxide.

Types of Modelling Available

There are two basic types of modelling: mathematical modelling and scale modelling. Mathematical modelling is usually carried out using a computer to solve a representation of the real world in the form of equations. Scale modelling usually uses a wind tunnel containing a physical representation of a scheme and, perhaps, its surrounding area.

Within mathematical modelling there are two distinct variants. Some methods are based upon simple empirical equations purporting to describe the way pollutants disperse in the atmosphere. Others will endeavour to "solve" equations for turbulent fluid flow.

There is a significant difference in cost between modelling traffic pollution using a scheme based on a simple empirical equation compared to either of the more sophisticated computational techniques or wind tunnel modelling. For this reason the simple technique is described below in more detail, together with some of its limitations to indicate when it may be necessary to consider the other techniques.

Simple Mathematical Modelling

The simple modelling normally used for air pollution assumes that a pollutant will move from its point of release with the mean wind velocity but spreading out and diluting so as to maintain a Gaussian or normal distribution of concentration. The rate at which it spreads out is related to the weather conditions at the time. A schematic diagram of Gaussian dispersion, albeit for a stack rather than vehicle exhaust, is given in Figure 2. This approach to modelling air pollution dispersion is well accepted and well validated under certain conditions.

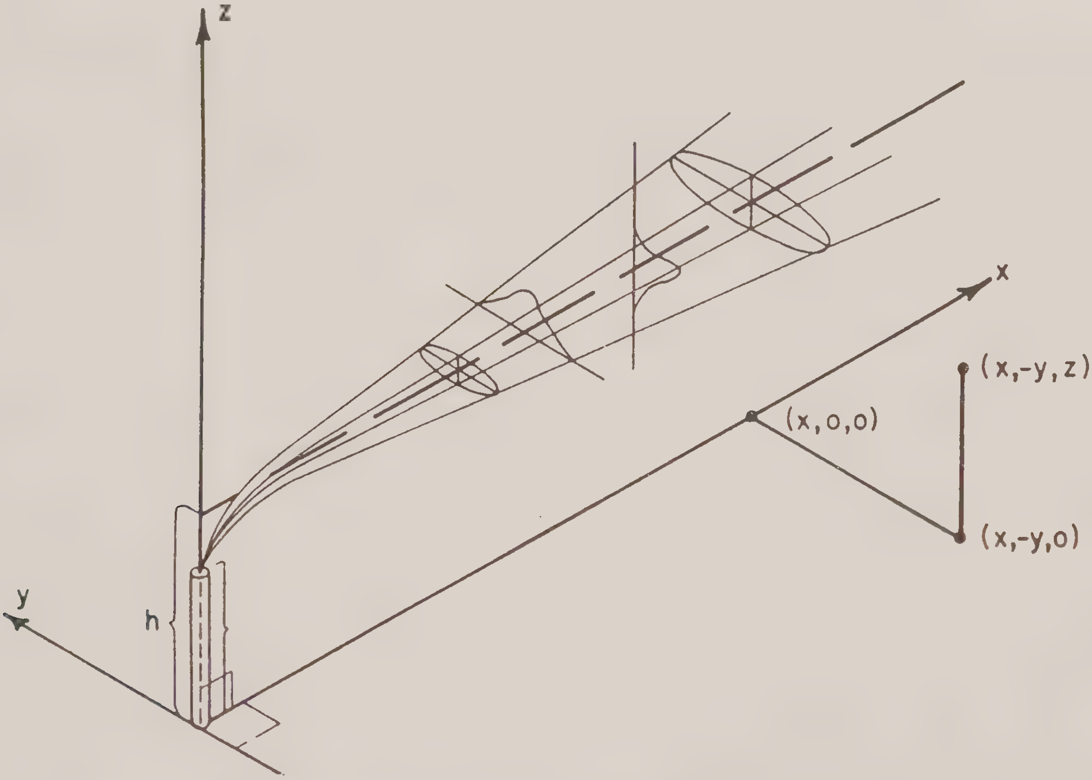


Figure 2: Diagram of Gaussian dispersion (From Turner 1967).

For vehicle exhaust the pollution source is all the roads within some distance range of the point of interest. These are usually divided, by the model, into sections which can be treated as individual point sources. The impact of the roads at some location is then the sum of the impacts from all the sections of all the roads. Modelling will normally be discussed in terms of providing a prediction at a single point. Clearly, if a prediction can be provided at one general point, then predictions can be produced for a set of points, and normally this will be done for a grid of points from which contours can be produced.

The two most common examples of this type of modelling are PREDCO, produced by the UK Transport and Road Research Laboratory (Hickman and Waterfield, 1984), and CALINE, which is available in various versions from the California Department of Transportation (Benson 1984). Both are essentially of the form described although there are some differences between them, mainly in the level of sophistication. However, fundamentally they operate in the same manner with the same inherent problems. These will be discussed later.

Useful Mathematical Modelling

The simple model approach provides a simple "average" result corresponding to the conditions of traffic and meteorology supplied to it. It is possible, from this, to provide the type of result described above, which could be in terms of once per year limits or percentile values, by a statistical combination of simple model results. If the required result is to relate to a time period such as a year then a set of simple results, obtained using a range of meteorological conditions representative of that period, will need to be combined. The expected day-to-day statistical variation in traffic levels also needs to be included in this calculation.

Thus, using relatively straightforward mathematical and computational techniques it is possible to obtain the required modelling results described above. However, the story does not really end there. If it did then monitoring could be virtually dispensed with and all the required answers could be obtained from a computer. The problem is accuracy. Good scientific practice requires some assessment of accuracy and computer modelling should be no exception to this.

Sources of Inaccuracy in Modelling Results

Outlined below are some of the reasons why modelling results may be inaccurate.

The Gaussian dispersion model, which forms the basis of both PREDCO and CALINE, is a realistic representation of the dispersion of material in the atmosphere, provided that the release is from an area which is flat both up and down wind. Clearly the majority of road situations are not of this form and Gaussian dispersion will not represent what actually happens. In particular, buildings, hills, valleys, cuttings and embankments will distort wind flow, create additional turbulence and limit the applicability of the Gaussian model. Taking the case of buildings, these will obstruct the wind flow and could be expected to detain pollution on their upwind side. Certainly the extra turbulence caused by the wind flowing past buildings is likely to dilute pollution beyond the first row of buildings. A simple Gaussian model will not allow for these effects. Figure 3 shows idealised flow streamlines passing a square building.

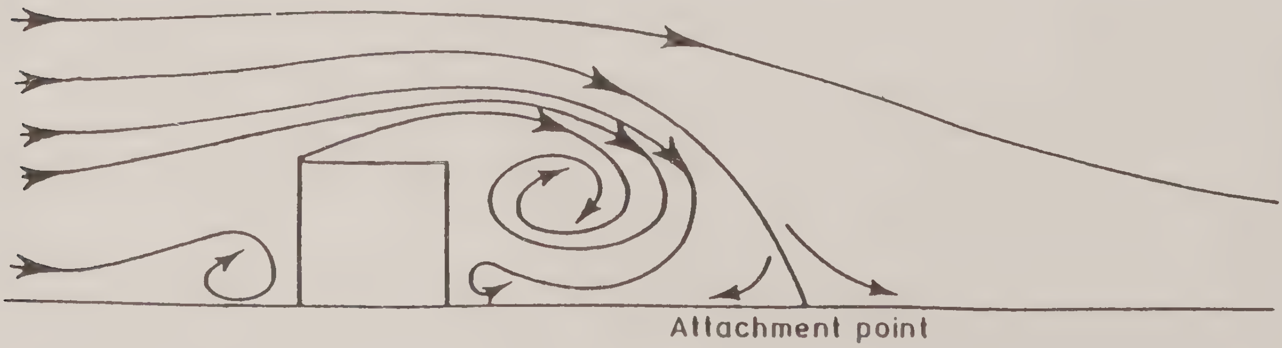


Figure 3: Idealised flow streamlines passing a square building (From Hunt *et al,* 1978)

Meaningful results have to be derived from some realistic combination of meteorological data. Often the nearest location from which comprehensive meteorological data is available is some distance away and probably not in the same "type" of area — in the sense of rural, urban or suburban — as the scheme under consideration. A road is also often between rows of buildings which channel the wind preferentially, if not exclusively, into two directions and therefore greatly distort the speed and direction statistics obtained from the nearest meteorological station, normally, the local airport.

The accuracy of the traffic predictions will also clearly affect the accuracy of the results, but equally so will types of data used. The behaviour of traffic at junctions has a major effect on pollution emissions; modelling results can therefore be greatly improved if queue length data and traffic speeds approaching junctions are available in addition to the traffic volumes and speeds on the significant roads.

If areas exceeding legislative or guideline levels are being predicted it is important to include realistic "background" levels of pollutants in the calculation. This is not straightforward, because in many cases, the background level is not a true uniform background but is dictated by the pollution drifting into the area being modelled from surrounding areas and will therefore vary with time of day and wind direction.

So Where Does This Leave Modelling?

Having first said that modelling can supply the answers required it has now been stated that these answers may be inaccurate. In fact modelling can very easily be so inaccurate as to be meaningless. Is modelling, therefore, of any use?

The answer is that it depends very much on circumstances and interpretation. Circumstances dictate the best approach to modelling a given situation. In many cases, when a road scheme is all on one level with few buildings or other obstructions positioned very close to the road, a simple model approach will be appropriate. This is in part because the alternatives are not without error and the marginal improvements possible may well not justify the additional cost. However, in other cases, such as in the vicinity of tunnel portals or at complex multi-level junctions, other methods may well be more appropriate. These need not always be expensive complex techniques; in some circumstances it may be more appropriate to develop a specialist simple model tailored to the specific circumstances.

The interpretation of the results needs to take proper account of their likely accuracy. This should include consideration of how the model has been validated against measured data. Just to show that a model performs well relative to a few measured results for one road scheme does not guarantee any level of performance in other circumstances. Therefore, ideally, any modelling study should include a study of the current situation including comparison of measured and modelled results. Where this is not possible, or where the proposed scheme is so different from the current situation so as to make such a comparison irrelevant, modelling results should be treated with suitable caution.

Conclusions

Modelling the impact of traffic pollution is both necessary and useful, provided that it is carried out with suitable care and allowance is made for all the complicating factors in any situation. It is particularly important that the uncertainties and limitations of any modelling work are passed on to the recipients of the study who may not be in a position to make such assessments for themselves.

Modelling air pollution impact for road schemes has been used here largely as an example, and much of what is discussed is equally applicable to other sources of air pollution such as power stations, incinerators and, to some extent, sources of odour, and to other areas of environmental modelling such as water quality.

References

Benson, PE, 1984, Caline — *A Dispersion model for predicting air pollutant concentrations near roadways,* California Department of Transportation Report, FHWA/CA/TL-84/15.

Hickman, AJ and Waterfield, VH, 1984, *A user's guide to the computer programs for predicting air pollution from road traffic,* TRRL Supplementary Report 806.

Hunt, JCR, Abell, CJ, Peterka, JA and Woo, H, 1978, *Kinematical studies of the flows around free surface mounted obstacles, applying topology to flow visualization,* J. Fluid Mech., 86, 179.

Turner, DB, 1967, *Workbook of atmospheric dispersion estimates.* Public Health Service, Pub. 999-AP-26, RA Tuft Sanitary Engineering Centre, Cincinnati, Ohio.

UPDATE

RAILWAY NOISE STANDARD

Early in 1990 the Government set up a committee to make recommendations as to at what level insulation grants should become available for homes affected by noise as a result of new railway lines. The Committee's report was published in February 1991 and the Government has now indicated its acceptance, in principle, of its recommendations. These are that insulation grants should be made available when noise from a new rail line reaches 68 dBA during the day and 63 dBA at night. (In a submission to the Committee — *Clean Air,* Summer 1990 — NSCA had recommended a day time standard of 65 dBA and a night time standard of 55 dBA.)

ECO LABEL SCHEME AGREED

European Community environment ministers have now agreed a scheme for a Community wide eco label. It is hoped to launch the scheme in the Autumn of 1992 with 10-12 product groups — this may include some groups for which pilot studies have been carried out (such as washing machines, paper products and paints).

Product groups and criteria will be agreed centrally and will be valid throughout the Community; the award of the labels will primarily be carried out at national level, with safeguards to ensure that the criteria are applied uniformly throughout the Community.

NORTHERN HEMISPHERE OZONE STUDY

A team of British scientists is taking part in a multinational study into ozone depletion in the northern hemisphere. From November 1991 to March 1992 about 250 scientists from 17 countries, including the USA, USSR, New Zealand, Japan and Europe, will conduct a series of experiments investigating the ozone layer during the Arctic winter and spring.

Ozone decreases of 50 per cent have been measured over the Antarctic, whereas smaller losses of up to 10 per cent have been measured in northern latitudes above 45 degrees N. The major aims of the European Arctic Stratospheric Ozone Experiment (EASOE) are to clarify the differences between the two hemispheres and to gain an understanding of the conditions in which a large ozone loss might occur in the northern hemisphere.

There are five main areas of research:

— Large research balloons capable of carrying loads of up to 500kg will be launched from Kiruna, Sweden. Their payloads will consist of a variety of scientific instruments capable of making measurements in the ozone layer altitudes, where depletion is thought to be occurring.

— Airplanes carrying instruments which can look through the ozone layer will fly from Kiruna.

— Ground-based instruments which make measurements looking up through the ozone layer, will be based at sites from Greenland to Russia, and from Spitzbergen to Greece.

— A number of small balloons carrying lightweight ozone sensors will be launched from more than 20 stations over a wide geographic area.

— The field experiments will be complemented by a wide variety of computer models of the atmospheric meteorological data and satellite data.

HEALTH PROTECTION AT WORK

The European Community has designated 1992 as European Year of Safety, Hygiene and Health Protection at Work — the year starts on 1 March 1992. The principal aims of the Year are to raise awareness among workers and employers about hazards in the workplace and the best way to deal with them; special emphasis is placed on the economic as well as the social importance of high standards of health and safety at work. Four themes are being given particular prominence: clean air at work; noise and vibration; safe working practices and well-being at work.

The Health and Safety Commission has set up a National Committee to stimulate activities in the UK. Further information can be obtained from George Dyson or Morris Johns at the HSE, Baynards House, 1 Chepstow Place, London W2 4TF.

CROP BURNING EXEMPTIONS

The Ministry of Agriculture, Fisheries and Food has announced an initial list of crops which will be exempted from the ban on the burning of crop residues which takes effect at the end of 1992. The crops to be exempted are herbage seeds, reeds, lavender, hops and potato haulms. A permanent exemption for linseed and a temporary exemption for cereal crops where soil makes incorporation impracticable are still under consideration.

VOC AGREEMENT

International agreement on cutting emissions of volatile organic compounds (VOCs) has now been agreed. This agreement in the form of a Protocol under the Convention on Long Range Transboundary Air Pollution was drawn up by the UN Economic Commission for Europe. The Protocol obliges signatories to secure a 30 per cent overall reduction in their VOC emissions by 1999, using 1988 as a base level (or another year between 1984 and 1990 to be notified when acceding to the Protocol). Other basic obligations include requirements, two years after the Protocol enters into force

— to apply national or international emission standards to new sources of VOCs, taking account of guidance on control technologies given in the Protocol;

— to apply national or international measures to products that contain solvents and promote the use of products with low or nil content; and

— to foster public participation in VOC emission control.

The Protocol, which will enter into force 90 days after it has been ratified by 16 countries, is the third to be signed under the Convention on Long Range Transboundary Air Pollution. The first two Protocols deal with reducing national emissions of sulphur dioxide (Helsinki Protocol) and freezing nitrogen oxides emissions (Sofia Protocol).

FAST "WARM-UP" SYSTEM FOR CATALYSTS

Catalysts do not operate efficiently until they reach a high temperature and this normally takes a few minutes. Since two-thirds of car journeys are less than five miles, the warming-up period for each journey accounts for a significant proportion of the overall emissions — it is estimated that as much as 80 per cent of the exhaust emissions in a short journey are produced during the first two minutes from start, when the catalyst is warming up.

Research engineers at Ford and Cambridge University have developed a simple method of 'firing-up' a catalytic converter to make it active in a fraction of the time normally taken by an engine's exhaust gases to bring it to operating temperature. Called "EGI" (Exhaust Gas Ignition) the Ford method involves heating the catalyst by briefly igniting a measured mixture of fuel and air in the exhaust system in an afterburner just ahead of the catalyst. Fuel to the afterburner is delivered using the exhaust gases from the engine which is calibrated to run rich, while air to the afterburner is supplied by an electrically-driven air pump.

The catalyst is heated to above 350 deg C — the level at which it becomes active — by igniting a controlled concentration of hydrogen which is produced within the engine's exhaust gases. As hydrogen is easily ignitable, it fires up the afterburner instantly as soon as the engine is started. The heat output from the afterburner is in the order of 7000 watts, which is sufficient to light off the catalyst within a few seconds.

ENVIRONMENT-FRIENDLY AEROSOL SYSTEM

A new aerosol propellant system which is environmentally-friendly, non-flammable and deters solvent abuse is being launched by The BOC Group.

The new system comprises two components working together: a brand new propellant mixture called Polygas liquid, incorporating carbon dioxide and acetone, and a unique polymer microsponge pellet. The latter acts as a reservoir for the Polygas liquid — absorbing it when the aerosol is pressurised and releasing carbon dioxide when the button is pressed. The released carbon dioxide compresses a bag or activates a piston, expelling the required amount of product while the propellant remains trapped in its sealed chamber.

The new system's pressurised can is similar to current aerosols in appearance and operating efficiency. It is compatible with existing packaging and filling equipment, requiring only minor modifications to the production line.

BOC claims the minimal amount of Polygas liquid used to pressurise the can is more environmentally-friendly than current alternatives such as hydrocarbons and CFCs, which are dispensed along with the product. Propellant volume is reduced by up to 90 per cent compared with other methods.

REVISED LANDFILL GAS ADVICE

A revised edition of Waste Management Paper No. 27 on the *Control of Landfill Gas* was published in November. It provides guidance on the monitoring and control of landfill gas and takes into account developments in research. Copies of the revised paper are being sent to all local authorities. It is also available from HMSO, price £8.50.

SMOKING IN PUBLIC PLACES

Owners and managers of places visited by the public are to be encouraged to make better provision for non-smokers. A new code of practice launched in December by the Departments of Environment, Employment and Health, the Welsh and Scottish Offices and the Department of Environment for N. Ireland sets out the Government's policy on smoking in public places and the best means of achieving the goal of a smoke-free environment. It says that the Government "is committed to creating a non-smoking environment, with facilities where appropriate for those who wish to smoke".

The code recognises that passive smoking can be hazardous to health and says that managers and owners of public places, such as pubs, hotels, restaurants, travel and health facilities, should give high priority to creating a smoke-free environment, with smoking restricted to specially provided rooms or areas. Where it is not possible to provide a special room, more attention should be paid to ventilation systems. The code suggests that smoking should be totally prohibited in public places frequented by young people and children, such as sports halls, community centres and fast food and other restaurants which have a wide appeal for young people.

Copies of the code are available from the Department of Environment, PO Box 135, Bradford, West Yorkshire BD9 4HU.

This code of practice does not cover smoking policies at work. Information about this can be obtained from (among others) the Health and Safety Executive, Baynards House, 1 Chepstow Place, Westbourne Grove, London W2 4TF, and from ASH (Action on Smoking and Health), 109 Gloucester Place, London W1H 3PH.

WATER QUALITY OBJECTIVES

For the first time, legally binding standards for water quality are to be set for all rivers, canals, lakes, estuaries and underground and coastal waters. Proposals for a new scheme for classifying water quality according to locally determined uses were published by the NRA in December. The scheme would enable statutory water quality objectives to be set which would give clear, fixed targets for improving the quality of individual stretches of water by specified dates.

In a paper on options for the nature and introduction of a scheme for setting statutory water quality objectives, the NRA says the new system would provide a firmer framework for deciding policy governing the setting of 'consents' to discharge waste to waters, and be the means for dealing with the growing problem of pollution from diffuse sources. This would enable it to manage river catchments in a way that would protect waters from pollution from all sources. It would, crucially, provide a key mechanism for maintaining existing good quality water and for requiring a steady improvement in polluted waters.

The NRA is recommending a phased introduction of statutory water quality objectives over the next few years, starting with rivers and priority catchments.

The main elements in the NRA's proposals are:

— a set of "use" categories with appropriate standards covering a wide range of possible uses, from basic amenity and fisheries, to watersports and abstraction for public water supply;

— the need to incorporate relevant EC Directives such as those for bathing water quality, and dangerous substances; and

— a new general classification scheme for all waters, which would incorporate standard key chemical tests used in previous water quality surveys, together with, for rivers, a new biological measurement based on the extent to which the presence of invertebrates in a water body falls short of what would be expected in a "clean" or unpolluted system.

RIVER QUALITY

Since 1958 surveys have been carried out periodically to establish the overall state of rivers, estuaries and canals in England and Wales. More recently these surveys have been carried out every five years. The latest results for the 1990 survey were published in December 1991 and are the first since privatisation of the water industry in 1989.

Rivers are classified as good, fair, poor and bad. Waters classified as good being suitable for potable supply abstractions, game and high class fisheries; waters of bad quality are considered "grossly polluting and likely to cause a nuisance".

The 1990 survey carried out by the National Rivers Authority shows that there has been a "real and significant" deterioration in the quality of some rivers in England and Wales, with a net downgrading in surveyed river quality of 4 per cent. Canals and estuaries have also deteriorated, resulting in a net downgrading of 8 and 2 per cent respectively. Much of the overall decline on river quality can be blamed on the South West where 22 per cent of surveyed river length was downgraded, and on the Thames region where 14 per cent was downgraded.

The NRA attributes some of the decline to the hot, dry summers of 1989 and 1990 which meant that in many areas there was a lack of water to dilute the inputs of contaminating waste; however excessive discharges from sewage works, industry and farms were also a major factor in the poor results.

AIR QUALITY ON CEEFAX

As well as being available by telephone, information from the Department of Environment's air quality bulletins is now available on the BBC's CEEFAX service on page 583. Currently data are given for nitrogen dioxide and sulphur dioxide levels. Maximum readings in parts per billion are shown, together with an explanation of whether this represents very good, good, poor or very poor air quality.

BOOKS AND REPORTS

ENVIRONMENTAL TECHNOLOGY — COMPETING IN A GROWING MARKET

KPMG. CBI, 1991. £5.00 non members. ISBN 0852013876.

This report presents the results of a survey and conference aimed at identifying the issues companies need to address if they are to successfully exploit the expanding market for environmental technology in the UK and the rest of Europe. Conclusions are that legislation is the main force driving the market, and product quality and customer service are important factors. British companies are urged to act now to take advantage of increasing opportunities, and advised that investment in research and development is essential, as the trend is towards pollution prevention rather than control.

THE GREEN ECONOMY. ENVIRONMENT, SUSTAINABLE DEVELOPMENT AND THE POLITICS OF THE FUTURE

M. Jacobs. Pluto Press. 1991. £27.50. ISBN 0745303129.

This book is an attempt to bridge the gap between Green philosophy and economic reality. The author shares the belief of the Greens that the relationship between industrialised society and the natural world must undergo a radical change, while acknowledging that any change requires considered practical, policies. Cost benefit analysis as a means of defining environmental objectives is rejected and integration of environmental, industrial and social policy put forward as an alternative. The criteria by which we judge a successful economy is also questioned. If economic growth means more pollution and a reduced quality of life, is it progress? This, and other questions posed make the book an interesting treatise on the options for a substainable future.

AUDIT AND REDUCTION MANUAL FOR INDUSTRIAL EMISSIONS AND WASTES

UNEP/IEO UNIDO. Published by United Nations Publications, 1991. US $40.00. ISBN 92-807-1303-5.

In order to improve industry efficiency through reduced raw material use and pollution prevention, it is important to know exactly where, within a plant, the significant emissions and waste streams arise. This manual prepared jointly by the Industry and Environment Office of the United Nations Environment Programme (UNEP/IEO) and the United Nations Industrial Development Organization (UNIDO) can be used by plant managers and staff wishing to reduce the plant's potential pollution impact. It will also be of use to consultants called in to advise on waste reduction options, and regulatory agencies interested in diagnosis of existing polluting installations.

The audit procedure outlined consists of three phases. Phase 1 is "preassessment" whereby the audit personnel is selected, plant staff are briefed on the procedure, and background information on the processes in the plant is collected. Phase 2 consists of a "material balance" whereby incoming and outgoing materials are evaluated and losses are identified. Phase 3, "synthesis", evaluates the materials losses and looks at options for reducing them at source thus saving raw materials as well as reducing pollution. Common experience is that in older plants the payback periods for many reduction measures just in terms of materials savings can be of the order of six months to two years.

AEROSOL SCIENCE. THEORY AND PRACTICE

M.M.R. Williams, S.K. Loyalka. Pergamon Press, 1991. £40.00. ISBN 0080372090.

Aimed primarily at the nuclear industry, the book looks at the fundamentals of aerosol behaviour. It provides practical examples of radioactive particles and distribution in size following a release arising from an accident within a nuclear system.

CARING FOR THE EARTH

IUCN/UNEP/WWF. Earthscan 1991. £9.95. ISBN 1853831263.

Subtitled 'A Strategy for Sustainable Living', this document is intended as a blueprint for the 1990s and sets out the steps the author organisations deem necessary to secure a sustainable future. It extends and emphasises the message of the 'World Conservation Strategy', published by the same organisations in 1980. The conclusion is that for this to be achieved, a new ethic is required both in personal attitudes and governments' policies.

GREENING THE WORKPLACE

TUC Publications. 1991. £4.00. ISBN 1850062234.

A guide that sets out to tackle workplace environmental issues from an employee perspective, laying down the structure for a joint environmental policy for the workplace, environmental auditing and questions to be asked of employers.

ENERGY POLICIES AND THE GREENHOUSE EFFECT

Vol II: Country Studies and Technical Options. M. Grubb et al. Royal Institute of International Affairs. 1991. £35.00. ISBN 185521198 X.

This volume completes the RIIA study. The first four chapters examine the technologies available for limiting emissions, technical constraints and analytical issues. Six studies explore the economic and political context of emissions abatement in countries at diverse stages of development — UK and the EEC, USA, Japan, the Soviet Union India and China. It points to the vast economic and political complexity of the problem posed by the greenhouse effect.

COUNTRYSIDE LAW

J.F. Garner, B.L. Jones. Shaw & Sons, 1991. £16.95. ISBN 0721910610.

Written for the lay reader, the book provides a comprehensive, up to date guide to the legislation governing the countryside in England and Wales — covering planning, access, wildlife protection, commons and pollution.

ESSENTIAL ELEMENTS OF NOISE AT WORK ASSESSMENTS

K. Kyriakides, R.N. Galbraith, Sandy Brown Associates, 1991. £9.30.

The report sets out the difficulties encountered by employers attempting to carry out assessments in compliance with the Noise at Work Regulations 1989. It identifies the causes of the inadequacies and suggests a blueprint for providing an assessment report.

STATE OF THE WORLD 1991

L.R. Brown. Earthscan 1991. £8.95. ISBN 185383114.

An examination of current global problems and possible solutions by Worldwatch researchers — including waste, urban transport, eastern Europe and population. The authors offer their view of the current state of the world and the way to a sustainable future.

RECYCLING OFFICER'S HANDBOOK

Friends of the Earth, 1991. £10.95. ISBN 1857500008.

Many local authorities now employ recycling officers. This handbook provides them with an overview of the issues and legislation, as well as practical advice on recycling options.

ENERGY AND ENVIRONMENT

Ed J. Dunderdale. Royal Society of Chemistry, 1990. ISBN 0851866476. £47.50.

Papers from a 1990 symposium which examine the environmental impact of energy consuming and energy producing processes, UK and EEC legislation controlling them and the measures taken to meet these requirements. The book provides an accessible guide to energy related pollution for the scientist and the layperson.

THE SOLID WASTE AND WATER ENVIRONMENTAL POCKET BOOK

Taylor Marketing Services Ltd, 1991. £29.00. ISBN 0946749027.

This excellent new annual publication provides a comprehensive guide to companies and authorities involved in waste and water management — covering national and local government, waste disposal authorities, treatment plant and services, water companies, consultancies and environmental organisations.

ACIDIC DEPOSITION — ITS NATURE AND IMPACTS

Ed F.T. Last, R. Watling. The Royal Society of Edinburgh, 1990. £42.00 ISBN 0902198076.

The record of a series of lectures given by international experts in September 1990, covering the chemistry of acid pollutants and their effects on soil, vegetation, freshwaters and buildings. A useful summary of the conclusions of these lectures is included.

HUMAN EXPOSURE ASSESSMENT FOR AIRBORNE POLLUTANTS

National Academy of Sciences, 1991. £19.30. ISBN 0309042844.

A study of human exposure to inhaled contaminants which potentially cause nuisance or adverse health effects. The report emphasises that inhalation must be placed in the context of total exposure and covers principles of assessment, sampling, surveying and modelling methods and applications of these.

MEASURING INDOOR AIR QUALITY — A PRACTICAL GUIDE

J. Yocom, S. McCarthy. Wiley, 1991. £40.00. ISBN 0471 907286.

Techniques for monitoring emissions of indoor pollutants and levels of pollution are described along with discussions of original research. A summary of international regulations and guidelines on indoor air quality is given, along with an assessment of future monitoring requirements.

YOUR HEALTH AND THE INDOOR ENVIRONMENT

R.E. Dunford, Nudawn, 1991. US $19.95. ISBN 096 28093 3 0.

British readers may find the style a little effusive, however this is a readable guide to indoor air pollutants, potential problems and alternatives. It comprehensively covers indoor contaminants — from cat saliva to household chemicals and plastic fingernails. Aimed at the general public, the author takes a ‘dark green’ stance. Not for the paranoid.

MONITORING HUMAN TISSUES FOR TOXIC SUBSTANCES

National Research Council. National Academy Press, 1991. £23.50. ISBN 0309044375.

The evaluation of the US National Research Council of the benefits of continuing a national human monitoring programme. It covers sampling methods, toxicological issues and programme management and design, and points to the importance of tissue monitoring in enhancing understanding of the effects of exposure to toxic substances.

BRITISH STANDARD CHARACTERISATION OF AIR QUALITY, BS 6069

Available from BSI Standards, Linford Wood, Milton Keynes MK14 6LE

Two new sections of the above standard have recently become available: Section 4.1 — Method for the determination of the mass concentration of sulphur dioxide: Hydrogen peroxide/barium perchlorate/Thorin method; and Section 4.2 — Method for the determination of asbestos plant emissions by fibre count measurement.

OTHER REPORTS RECEIVED:

H.W. Gottinger, Oxford Institute of Energy Studies, 1991. All £14.00.

- Energy — Economy — Environmental Models with special Reference to CO2 Emission Control;
- Economic Models of Optimal Use under Global Environmental Constraints;
- Optional Economic Growth When CO2 Constraints are Critical Policy Models of Long-run Growth under Global Environmental Constraints.

CLEAN AIR AROUND THE WORLD

SECOND EDITION EDITOR: LOVEDAY MURLEY

An essential reference book for anyone wishing to keep abreast of air pollution legislation around the world. Specialist organisations from 27 countries have compiled up-to-date information about their own pollution problems, monitoring systems and regulatory frameworks. These countries, all members of IUAPPA, represent a wide range of economic and industrial development. Two additional chapters giving the views of the United Nations and the European Community provide an international overview of pollution control.

Clean Air Around the World offers an invaluable guide to the latest thinking in the field of environmental protection. It is structured to facilitate a comparison of the differing approaches adopted by nations and the assessment of their effectiveness. Anyone with an interest in the rapidly changing world of pollution control will want to have access to a copy.

500 pages, A5, soft covers, £32.00 inclusive of surface mail postage.

Available from NSCA, 136 North Street, Brighton BN1 1RG

Access and Visa Cards accepted

FUTURE EVENTS

6-7 FEBRUARY — CONTAMINATED LAND — POLICY REGULATION AND TECHNOLOGY

The Department of the Environment has published proposals for registers of sites subject to potentially contaminating uses under the *Environmental Protection Act 1990* and the National Rivers Authority is expected to shortly announce further policy initiatives. The conference will provide an update on these developments and background information on the legal and regulatory situation in Northern Ireland and Scotland. It will provide an opportunity to learn of new developments and services offered by UK companies in the field of soil clean-up, of efforts to improve the guidance available in the UK, and about efforts to develop technologies through international collaboration.
Venue: Inn on the Park Hotel, Hamilton Park, London.
Details: Amanda Wright, IBC Technical Services Ltd. Tel: 071 637 4383.

18-19 FEBRUARY — INCINERATION — THE GREAT DEBATE

Whilst landfill is an environmentally acceptable disposal route for many inert waters there are many others which are becoming less appropriate as alternative disposal routes become available. Incineration is now a practical alternative to landfill for a wide range of materials. This conference will review the new legislative framework and give a series of examples of the types of incinerator now available and how they can be matched to specific waste streams.
Venue: Holiday Inn, Manchester.
Details: Amanda Wright, IBC Technical Services. Tel: 071 637 4383.

25-26 FEBRUARY — GROUNDWATER POLLUTION

Traditionally, groundwater has had two advantages over surface water. The first of these is that the aquifer acts as a natural reservoir which can be tapped as and when required thus obviating the need to construct expensive surface structures with their attendant environmental problems. Secondly groundwater is much less vulnerable to pollution and has long been looked upon as a source of high quality water requiring minimal treatment. This conference will provide participants with up-to-date coverage of the groundwater pollution problem in the UK and will place these within a legislative and administrative framework.
Venue: The Café Royal, London W1.
Details: Amanda Wright, IBC Technical Services. Tel: 071 637 4383.

4 MARCH — ENVIRONMENTAL RESPONSIBILITIES FOR LOCAL AUTHORITIES

One day conference to examine the implications of the *Environmental Protection Act* for local authorities in relation to commercial, regulatory and enforcement activities. The conference will also discuss the dilemma which local authorities may face in enforcing strict pollution control measures and thus risking discouraging new industrial development in their area. Waste collection, regulation of waste disposal, air pollution, contaminated land and environmental audits will all be looked at.

Venue: The Café Royal, London.
Details: Athina Peters, IBC Legal Studies and Services. Tel: 071 637 4383.

25-26 MARCH — NSCA WORKSHOP

NSCA's annual one and a half day workshop will look at the following: clean air — trends and issues; air pollution and risk assessment; environmental auditing; and access to information.
Venue: Lincoln College, Oxford.
Details: Peter Mitchell, NSCA. Tel: 0273 26313.

31 MARCH — INDUSTRIAL AIR POLLUTION MONITORING

A one-day seminar update with HMIP, industry, local authority and environmental consultancy input.
Venue: University of Leeds.
Details: Dianne Taylor, University of Leeds. Tel: 0532 332511.

1-2 APRIL — INDUSTRIAL AIR POLLUTION MONITORING

A short course for those involved in emissions monitoring, emissions testing on a contract basis, manufacturers of pollution control equipment and those in local authorities with responsibilities towards Schedule B processes under the *Environmental Protection Act 1990.*
Venue: University of Leeds.
Details: Dianne Taylor, University of Leeds. Tel: 0532 332511.

2-5 APRIL — SUSTAINABLE CITY — VISION, POLICY AND ACTION FOR REVIVING THE CITY

Cities tend to be unhealthy and inequitable places to live. The pollution associated with towns and cities places major burdens on the local and global environments. Working towards sustainability has implications for the policies and practices of central and local government as well as those of developers, planners, architects, educationalists and citizens. This interactive forum aims to clarify understanding of sustainability in the context of European urban policy and opportunities for practical, local green initiatives.
Venue: Brighton Polytechnic.
Details: The Conference Co-ordinator, Lewis Cohen Urban Studies Centre, Brighton Polytechnic. Tel: 0273 673416.

12-15 MAY — THE MITIGATION OF TRAFFIC NOISE IN URBAN AREAS

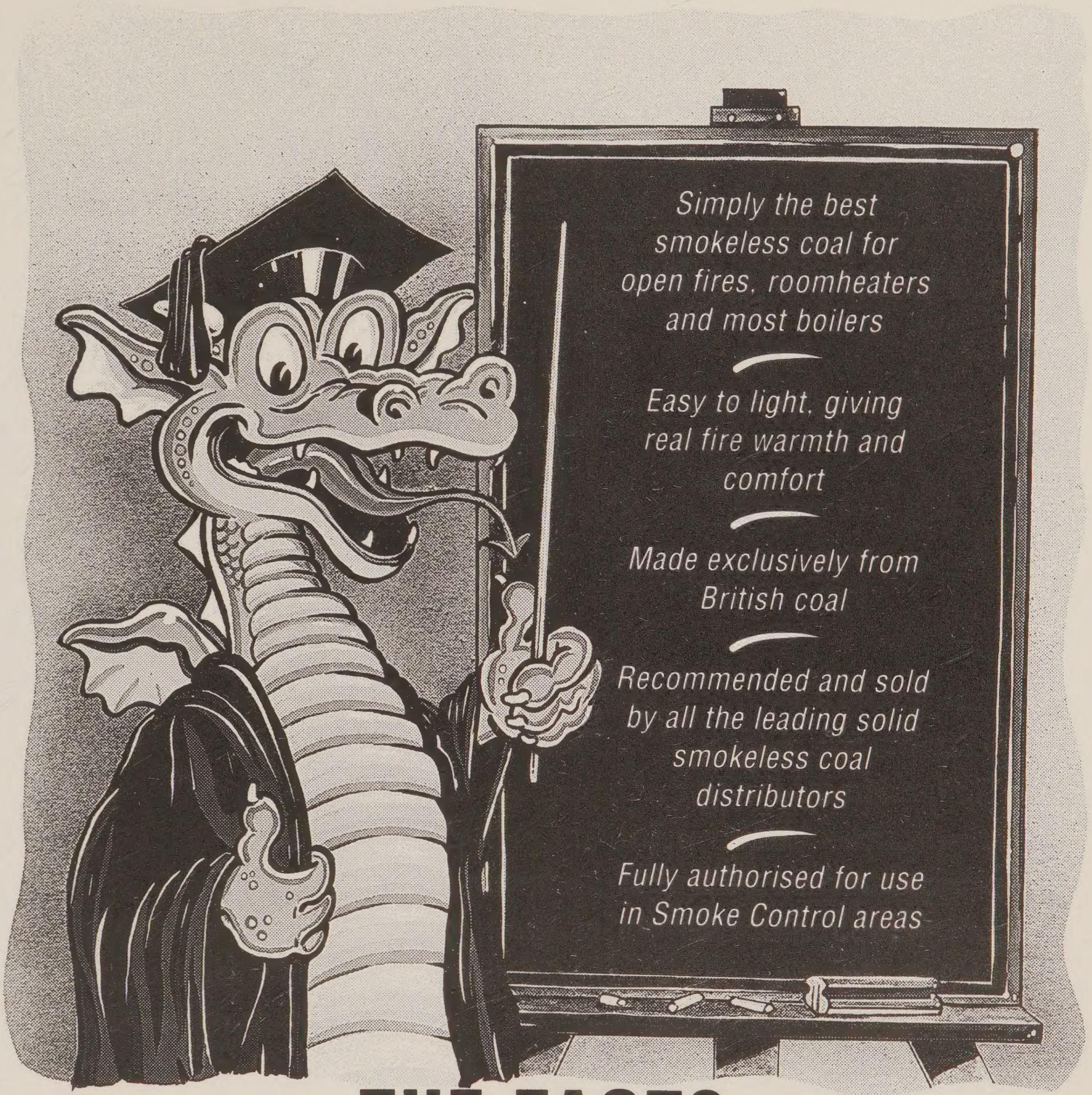
The symposium will address the following themes; Vehicle noise reduction, traffic management and planning, low noise road surfacing, noise barriers, urban planning and building design, traffic noise reduction and city management.
Venue: Palais des Congrès de Nantes, France.
Details: Palais des Congrès. Tel: +33 4035 3020.

23-25 JUNE — 17TH INTERNATIONAL CONGRESS OF THE INTERNATIONAL ASSOCIATION AGAINST NOISE

The major aim of the conference is to foster East-West co-operation on noise control, standards and guidelines. The main topics to be discussed are: noise impact on the environment, standards and assessment, transportation noise, industrial and community noise, economic aspects of noise control and recommendations for noise reduction and planning against noise.
Venue: Czech Technical University, Prague.
Details: Mrs Alena Náprstková, Czech Technical University. Tel: +42 2 332 4887.

7 JULY — ENGINE EMISSIONS MEASUREMENT

A short course to explain the function of heated on-line gas analysis systems for CO_2, CO, O_2, UHC, NOx, and SO_2 measurements from engines, demonstrated by a working system with data-logging onto a computer. Computer processing of gas analysis measurements to derive air/fuel ratios, combustion efficiency, temperature and various pollution parameters will be discussed.
Venue: University of Leeds.
Details: Dianne Taylor, University of Leeds. Tel: 0532 332511.



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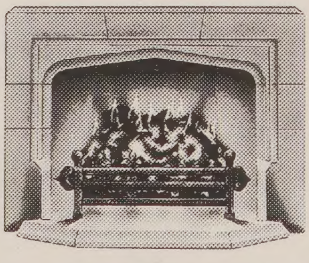

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